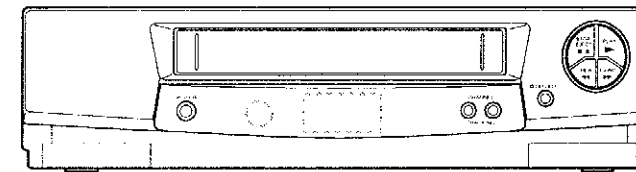


HITACHI

SERVICE MANUAL



TK

No. 4804E

VT-MX231A
VT-MX231AC
VT-MX231AW
VT-MX431A
VT-MX431AC

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VHS

This video deck is VHS type video recorder. For proper operation, only the VHS type cassette must be used.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

VIDEO CASSETTE RECORDER

June

1998

Image & Information Media Systems Division, Tokai

MAIN SECTION

VIDEO CASSETTE RECORDER

VT-MX231A / VT-MX231AC / VT-MX231AW
VT-MX431A / VT-MX431AC

MAIN SECTION

- Specifications
- Preparation for Servicing
- Adjustment Procedures
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SPECIFICATIONS

Models: VT-MX231A/MX231AC/MX231AW

Description	Unit	Minimum	Nominal	Maximum	Condition
1. Video					
1-1 Video Output (PB)	Vp-p	0.8	1.0	1.2	SP Mode
1-2 Video Output (R/P)	Vp-p	0.8	1.0	1.2	
1-3 Video S/N Y (R/P)	dB	40	45		SP Mode
1-4 Video Color S/N AM (R/P)	dB	35	44		SP Mode
1-5 Video Color S/N PM (R/P)	dB	31	38		SP Mode
1-6 Resolution (PB)	Line	210	230		SP Mode
2. Servo					
2-1 Jitter Low (R/P)	μsec		0.05	0.2	SP Mode
2-2 Wow & Flutter (R/P)	%		0.25	0.6	SP Mode
3. Normal Audio					
3-1 Output (PB)	dBV	-10	-6	-2	SP Mode
3-2 Output (R/P)	dBV	-10	-6	-2	SP Mode (JIS A)
3-3 S/N (R/P)	dB	36	40		SP Mode
3-4 Distortion (R/P)	%		1.5	4.0	SP Mode
3-5 Freq. response (R/P) at 200Hz	dB	-6	-3		SP Mode
(-20dB ref. 1kHz) at 8kHz	dB	-6	-2		SP Mode
4. Tuner					
4-1 Video Output (E-E)	Vp-p	0.8	1.0	1.2	E-E Mode
4-2 Video S/N (E-E)	dB	40	45		E-E Mode
4-3 Audio Output (E-E)	dBV	-9	-6	-3	E-E Mode
4-4 Audio S/N (E-E)	dB	40	50		E-E Mode (JIS A)

Models: VT-MX431A/MX431AC

Description	Unit	Minimum	Nominal	Maximum	Condition
1. Video					
1-1 Video Output (PB)	Vp-p	0.8	1.0	1.2	SP Mode
1-2 Video Output (R/P)	Vp-p	0.8	1.0	1.2	
1-3 Video S/N Y (R/P)	dB	41	44		SP Mode
1-4 Video Color S/N AM (R/P)	dB	35	44		SP Mode
1-5 Video Color S/N PM (R/P)	dB	33	37		SP Mode
1-6 Resolution (PB)	Line	210	230		SP Mode
2. Servo					
2-1 Jitter Low (R/P)	μsec		0.05	0.1	SP Mode
2-2 Wow & Flutter (R/P)	%		0.2	0.4	SP Mode
3. Normal Audio					
3-1 Output (PB)	dBV	-10	-6	-2	SP Mode
3-2 Output (R/P)	dBV	-10	-6	-2	SP Mode (JIS A)
3-3 S/N (R/P)	dB	38	43		SP Mode
3-4 Distortion (R/P)	%		2	4.0	SP Mode
3-5 Freq. response (R/P) at 200Hz	dB	-6	0		SP Mode
(-20dB ref. 1kHz) at 8kHz	dB	-6	-1.5		SP Mode
4. Tuner					
4-1 Video Output	Vp-p	0.8	1.0	1.2	E-E Mode
4-2 Video S/N (S/N Y signal)	dB	40	47		E-E Mode
4-3 Audio Output (1kHz)	dBV	-10	-6	-4	E-E Mode
4-4 Audio S/N (1kHz)	dB	40	46		E-E Mode (JIS A)

Note: Nominal specs represent the design specs. All units should be able to approximate these – some will exceed and some may drop slightly below these specs. Limit specs represent the absolute worst condition that still might be considered acceptable; In no case should a unit fail to meet limit specs.

IMPORTANT SAFETY PRECAUTIONS

Product Safety Notice

Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by a **▲** on schematics and in parts lists. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire, and/or other hazards. The Product's Safety is under review continuously and new instructions are issued whenever appropriate. Prior to shipment from the factory, our products are carefully inspected to confirm with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

Precautions during Servicing

A. Parts identified by the **▲** symbol are critical for safety. Replace only with part number specified.

B. In addition to safety, other parts and assemblies are specified for conformance with regulations applying to spurious radiation. These must also be replaced only with specified replacements.

Examples: RF converters, RF cables, noise blocking capacitors, and noise blocking filters, etc.

C. Use specified internal wiring. Note especially:

- 1) Wires covered with PVC tubing
- 2) Double insulated wires
- 3) High voltage leads

D. Use specified insulating materials for hazardous live parts. Note especially:

- 1) Insulation tape
- 2) PVC tubing
- 3) Spacers
- 4) Insulators for transistors

E. When replacing AC primary side components (transformers, power cord, etc.), wrap ends of wires securely about the terminals before soldering.

F. Observe that the wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.).

G. Check that replaced wires do not contact sharp edges or pointed parts.

H. When a power cord has been replaced, check that 5 - 6 kg of force in any direction will not loosen it.

I. Also check areas surrounding repaired locations.

J. Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

K. Crimp type wire connector

The power transformer uses crimp type connectors which connect the power cord and the primary side of the transformer. When replacing the transformer, follow these steps carefully and precisely to prevent shock hazards.

Replacement procedure

1) Remove the old connector by cutting the wires at a point close to the connector.

Important: Do not re-use a connector. (Discard it.)

2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

4) Use a crimping tool to crimp the metal sleeve at its center. Be sure to crimp fully to the complete closure of the tool.

L. When connecting or disconnecting the internal connectors, first, disconnect the AC plug from the AC outlet.

Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts, and wires have been returned to their original positions. Afterwards, do the following tests and confirm the specified values to verify compliance with safety standards.

1. Clearance Distance

When replacing primary circuit components, confirm specified clearance distance (d) and (d') between soldered terminals, and between terminals and surrounding metallic parts. (See Fig. 1)

Table 1 : Ratings for selected area

AC Line Voltage	Clearance Distance (d) (d')
110~240 V 120V	≥ 3.2 mm (0.126 inches)

Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

2. Leakage Current Test

Confirm the specified (or lower) leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.) is lower than or equal to the specified value in the table below.

Measuring Method (Power ON) :

Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across the terminals of load Z. See Fig. 2 and the following table.

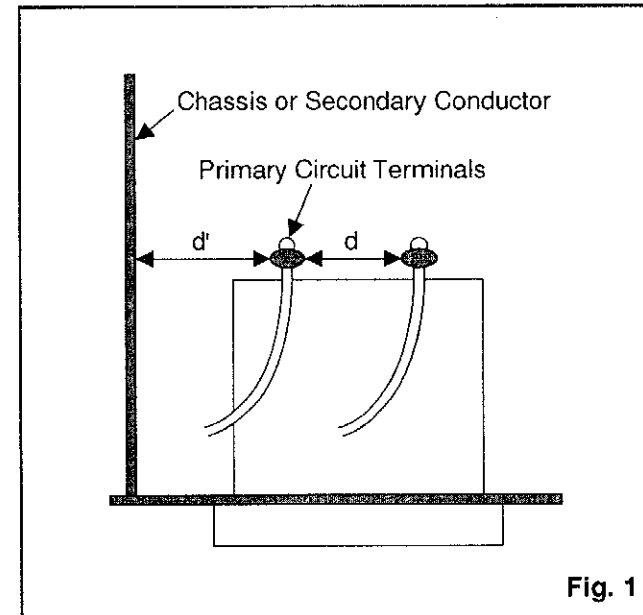


Fig. 1

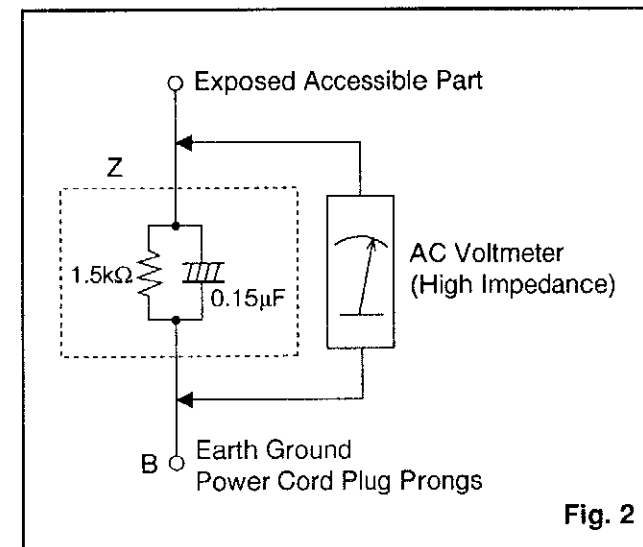


Fig. 2

Table 2 : Leakage current ratings for selected areas

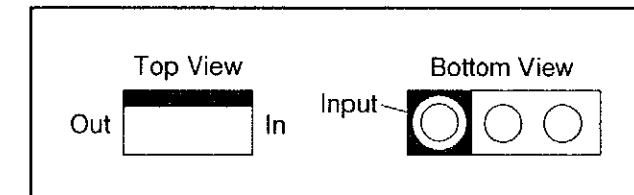
AC Line Voltage	Load Z	Leakage Current (I)	Earth Ground (B) to:
110~240 V 120V	0.15μF CAP. & 1.5kΩ RES. Connected in parallel	$i \leq 0.5\text{mA Peak}$	Exposed accessible parts

Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

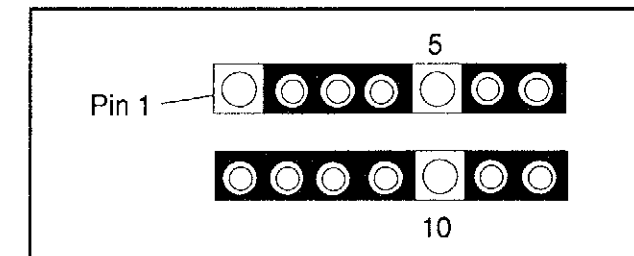
STANDARD NOTES FOR SERVICING

Circuit Board Indications

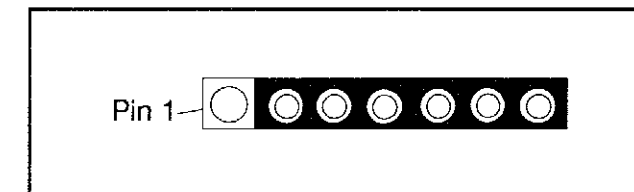
a. The output pin of the 3 pin Regulator ICs is indicated as shown.



b. For other ICs, pin 1 and every fifth pin are indicated as shown.

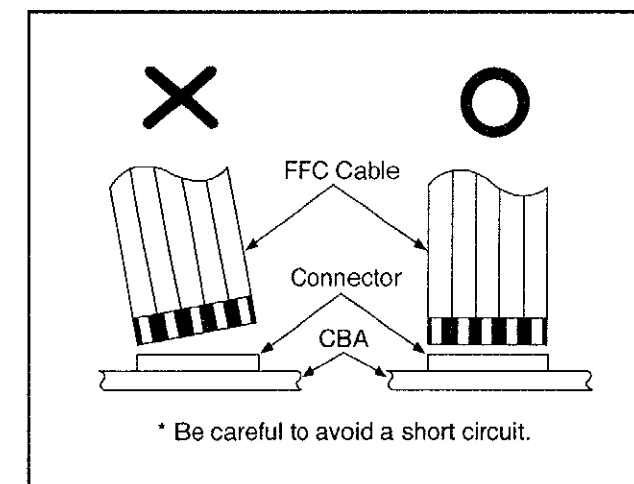


c. The 1st pin of every male connector is indicated as shown.



Instructions for Connectors

- When you connect or disconnect the FFC (Flexible Foil Connector) cable, be sure to first disconnect the AC cord.
- FFC (Flexible Foil Connector) cable should be inserted parallel into the connector, not at an angle.



How to Remove / Install Flat Pack-IC

1. Removal

With Hot-Air Flat Pack-IC Desoldering Machine:

- Prepare the hot-air flat pack-IC desoldering machine, then apply hot air to the Flat Pack-IC (about 5 to 6 seconds). (Fig. S-1-1)

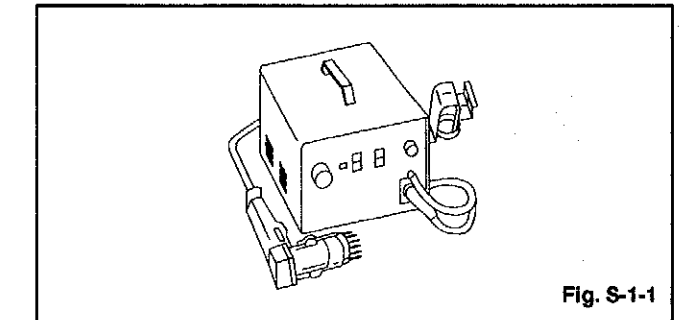


Fig. S-1-1

- Remove the flat pack-IC with tweezers while applying the hot air.
- Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)
- Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

Caution:

- Do not supply hot air to the chip parts around the flat pack-IC for over 6 seconds because damage to the chip parts may occur. Put masking tape around the flat pack-IC to protect other parts from damage. (Fig. S-1-2)
- The flat pack-IC on the CBA is affixed with glue, so be careful not to break or damage the foil of each pin or the solder lands under the IC when removing it.

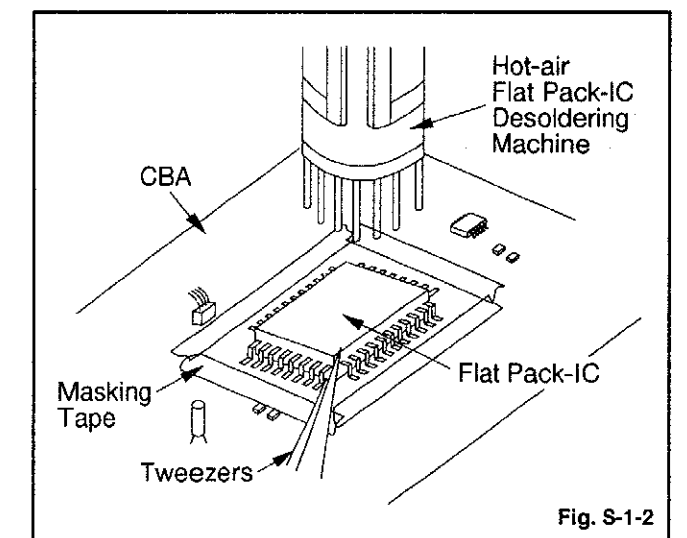


Fig. S-1-2

PREPARATION FOR SERVICING

How to Use U17 Deck Extension Cable

- (1) Remove the Deck Mechanism Assembly. If needed, remove the Main CBA from the chassis. Refer to "Cabinet Disassembly Instructions" on page 1-6-1.
- (2) Connect Main CBA and Deck with the U17 Deck Extension Cable (A) as shown in Fig. 1. And connect Main CBA and Deck with U17 Deck Extension Cable (B) as shown in Fig. 1. Connect 2 Clips on U17 Deck Extension Cable (B) to Shield on Main CBA.

(U17 Deck Extension Cable: 7069201)

Note 1: There are 3 types of U17 Deck Extension Cable (A). They are for 2 Head, 4 Head, and Hi-Fi. Use a connector indicated as shown. Be careful not to let the unused connector contact other parts.

Note 2: Some noise will be present in the playback picture when the extension cable is used.

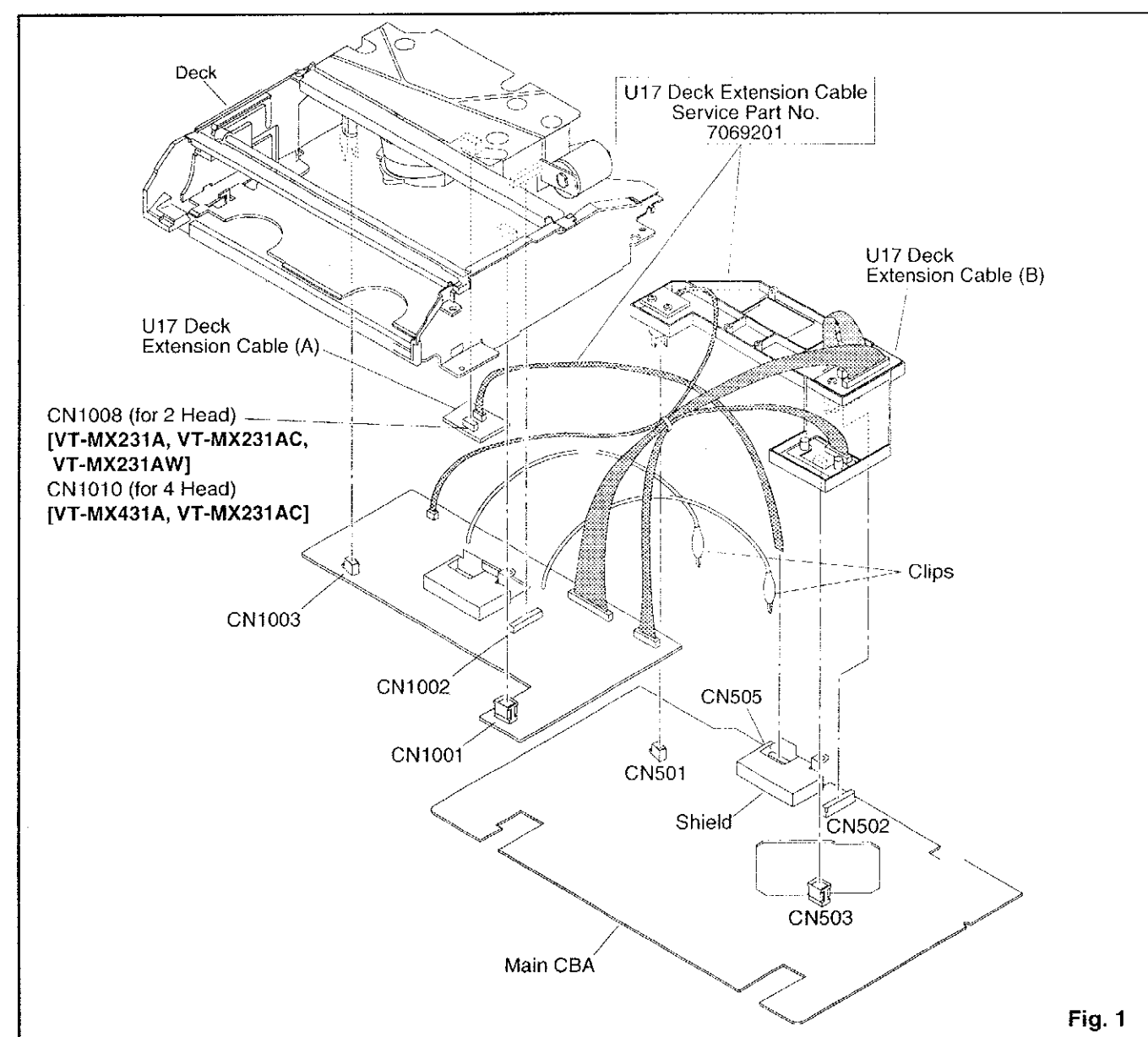


Fig. 1

How to Enter the Service Mode

Note: When the unit is set in the service mode, the display will keep blinking.

About Optical Sensors

Caution:

An optical sensor system is used for the Tape Start and End Sensors on this equipment. Carefully read and follow the instructions below. Otherwise the unit may operate erratically.

What to do for preparation

Insert a tape into the Deck Mechanism Assembly and press the PLAY button. The tape will be loaded into the Deck Mechanism Assembly. Make sure the power is on, connect TP502 (SENSOR INHIBITION) to TP501 (GROUND). This will stop the function of Tape Start Sensor, Tape End Sensor and Reel Sensors. (If these TPs are connected before plugging in the unit, the function of the sensors will stay valid.) See Fig. 2.

Note: Because the Tape End Sensors are inactive, do not run a tape all the way to the start or the end of the tape to avoid tape damage.

About REC-Safety Switch

Caution:

The REC-Safety Switch is directly mounted on the Main CBA. When the Deck Mechanism Assembly is removed from the Main CBA for servicing, this switch does not work automatically.

What to do for preparation

In order to record, press the Rec button while pushing REC-SAFETY SW on the Main CBA. See Fig. 2.

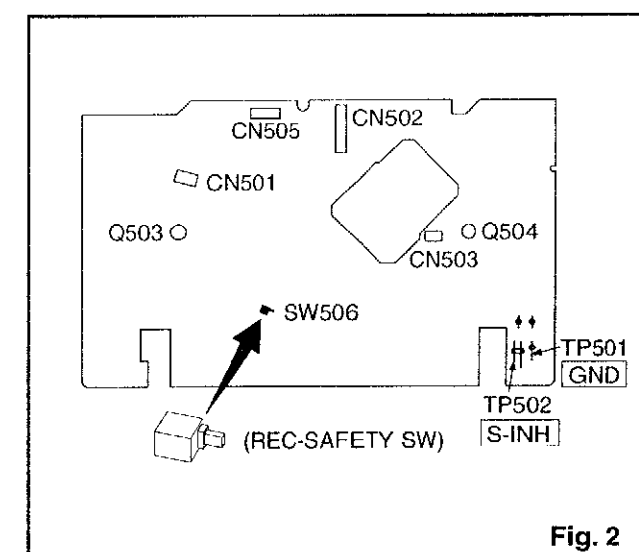


Fig. 2

OPERATING CONTROLS AND FUNCTIONS

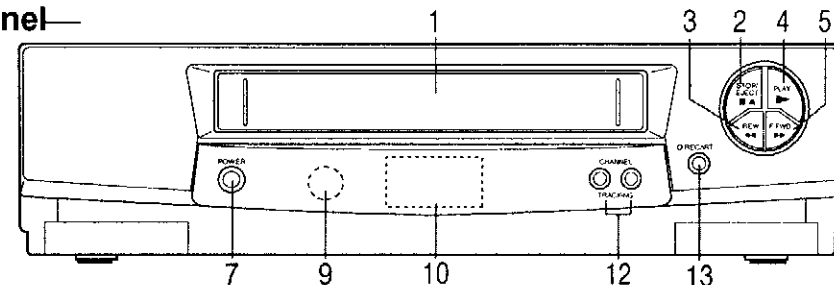
Models : VT-MX231A/MX231AC/MX231AW

NOTES:

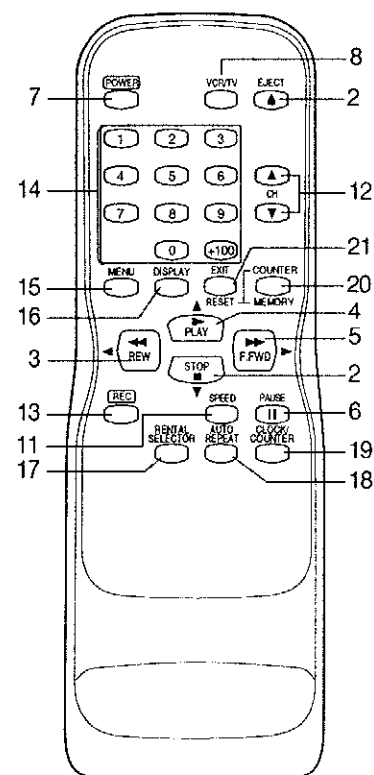
Some controls are located on both the VCR and on the remote control, some are only located on one, some controls operate certain functions only in one location. See each description for details.

We do not recommend the use of universal remote controls. Not all of the functions may be controlled with a universal remote control. If you decide to use a universal remote control with this unit, please be aware that the code number given may not operate this unit. In this case, please call the manufacturer of the universal remote control.

—VCR Front Panel—



—Remote Control—



1. Cassette Compartment

2. **STOP button**— Press to stop the tape motion.

EJECT button—Press to remove a tape from the VCR.

▼ button—Press to enter digits when setting program (For example: setting clock or timer program). Press to select the setting modes from the on screen menu. (only on the remote control)

3. **REW button**—Press to rewind the tape, or to view the picture rapidly in reverse during the playback mode. (Rewind Search)

◀ button—Press to cancel a setting of timer program. Press to correct digits when setting program (For example: setting clock or timer program). Press to add or delete channel numbers during channel preset. (only on the remote control)

4. **PLAY button**—Press to begin playback.

▲ button—Press to enter digits when setting program (For example: setting clock or timer program). Press to select the setting modes from the on screen menu. (only on the remote control)

5. **F.FWD button**—Press to rapidly advance the tape, or view the picture rapidly in forward during playback. (Forward Search)

▶ button—When setting program (For example: setting clock or timer program), press to determine your selection and proceed to the next step you want to input. Press to determine the setting modes from the on screen menu. Press to add or delete channel numbers during channel preset. (only on the remote control)

6. **PAUSE button**—Press to temporarily stop the tape during recording or to view a still picture during playback. (only on the remote control)

7. **POWER button**—Press to turn VCR on and off. Press to activate timer recording.

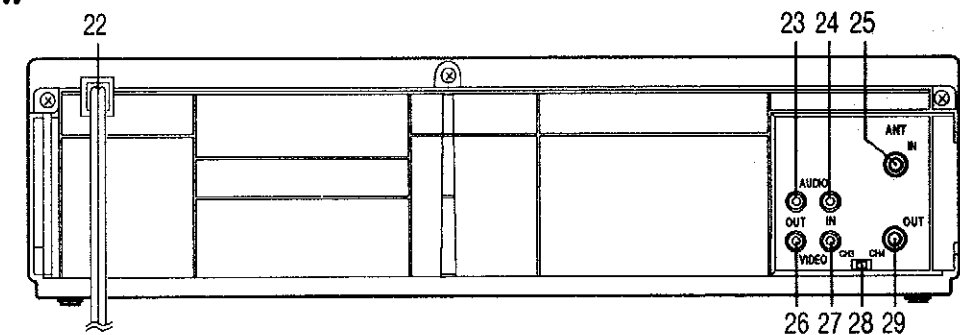
8. **VCR/TV button**—Press to select TV or VCR mode. (only on the remote control)

VCR position: to view playback, to monitor video recordings or watch TV using the VCR tuner.

TV position: to watch TV or to view one program while recording another.

Models : VT-MX231A/MX231AC/MX231AW

—Rear View—



9. **Remote sensor window**—Receives the infrared signals from the remote control.

10. **Digital display**

11. **SPEED button**—Press to choose the desired recording speed : SP/LP/SLP. (only on the remote control)

12. **CHANNEL(CH) ▲ / ▼ buttons**—Press to select the desired channels for viewing or recording.

Tracking function—Press to minimize video 'noise' (lines or dots on screen) during playback. (only on the VCR)

Press to stabilize the picture in the Still mode when the picture begins to vibrate vertically.

13. **REC button**—Press for manual recording.

IRT button—Press to activates Instant Recording Timer. (only on the VCR)

14. **NUMBER buttons**—Press to select desired channels for viewing or recording. To select channels from 1 to 9, first press "0" button then 1 to 9. (only on the remote control)

+100 button—When selecting cable channels which are higher than 99, press this button first, then press the last two digits. (To select channel 125, first press "+100" button then press "2" and "5"). (only on the remote control)

15. **MENU button**—Press to display the menus on the TV screen. Press to exit the menus on the TV screen. (only on the remote control)

16. **DISPLAY button**—Press to display the counter or the current channel number and the current time on the TV screen. (only on the remote control)

17. **RENTAL SELECTOR button**—Press to set the Rental Play mode on and off during playback. (only on the remote control)

18. **AUTO REPEAT button**—Press to repeat playback automatically. (only on the remote control)

19. **CLOCK/COUNTER button**—Press to display or alternate between clock and counter on the TV screen. (only on the remote control)

20. **COUNTER MEMORY button**—Press to set counter memory on and off. (only on the remote control)

21. **COUNTER RESET button**—Press to reset counter to 0:00:00. (only on the remote control)

EXIT button—Press to exit the menus on the TV screen. (only on the remote control)

22. **Power cord**—Connect to a standard AC outlet (110-240V, 50/60Hz).

23. **AUDIO OUT jack**—Connect to the audio input jack of your audio equipment or another VCR.

24. **AUDIO IN jack**—Connect to the audio output jack of your audio equipment or another VCR.

25. **ANT. IN terminal**—Connect to an antenna, Cable system or Satellite system.

26. **VIDEO OUT jack**—Connect to the video input jack of your video camera or another VCR.

27. **VIDEO IN jack**—Connect to the video output jack of your video camera or another VCR.

28. **CH3/CH4 selector switch**—Use to select a video output channel (3 or 4) for VCR playback.

29. **ANT. OUT terminal**—Connects to the antenna input terminal on your TV.

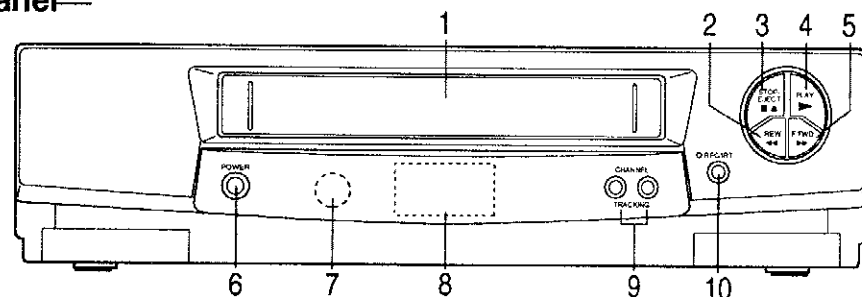
Models : VT-MX431A/MX431AC

NOTES:

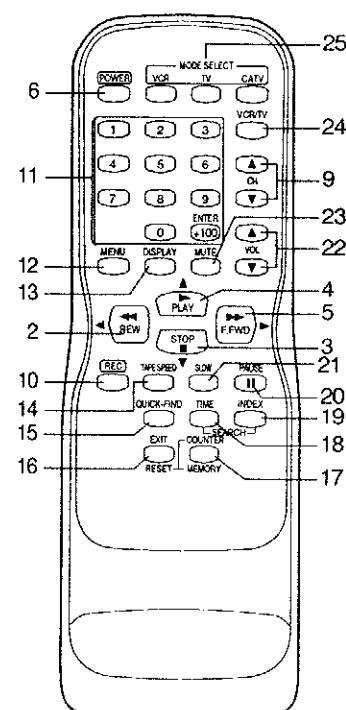
Some controls are located on both the VCR and on the remote control, some are only located on one, some controls operate certain functions only in one location. See each description for details.

We do not recommend the use of universal remote controls. Not all of the functions may be controlled with a universal remote control. If you decide to use a universal remote control with this unit, please be aware that the code number given may not operate this unit. In this case, please call the manufacturer of the universal remote control.

—VCR Front Panel—



—Remote Control—



1. Cassette Compartment

2. REW button—Press to rewind the tape, or to view the picture rapidly in reverse during the playback mode. (Rewind Search)

◀ button—Press to cancel a setting of timer program. Press to correct digits when setting program (For example: setting clock or timer program). Press to add or delete channel numbers during channel preset. (only on the remote control)

3. STOP button— Press to stop the tape motion.

EJECT button—Press to remove a tape from the VCR. (only on the VCR)

▼ button—Press to enter digits when setting program (For example: setting clock or timer program). Press to select the setting modes from the on screen menu. (only on the remote control)

4. PLAY button—Press to begin playback.

▲ button—Press to enter digits when setting program (For example: setting clock or timer program). Press to select the setting modes from the on screen menu. (only on the remote control)

5. F.FWD button—Press to rapidly advance the tape, or view the picture rapidly in forward during playback. (Forward Search)

▶ button—When setting program (For example: setting clock or timer program), press to determine your selection and proceed to the next step you want to input. Press to determine the setting modes from the on screen menu. Press to add or delete channel numbers during channel preset. (only on the remote control)

6. POWER button—Press to turn VCR on and off. Press to activate timer recording.

7. Remote sensor window—Receives the infrared signals from the remote control.

8. Digital display

9. CHANNEL(CH) ▲ / ▼ buttons—Press to select the desired channels for viewing or recording.

Tracking function—Press to minimize video 'noise' (lines or dots on screen) during playback (only on the VCR) or slow mode.

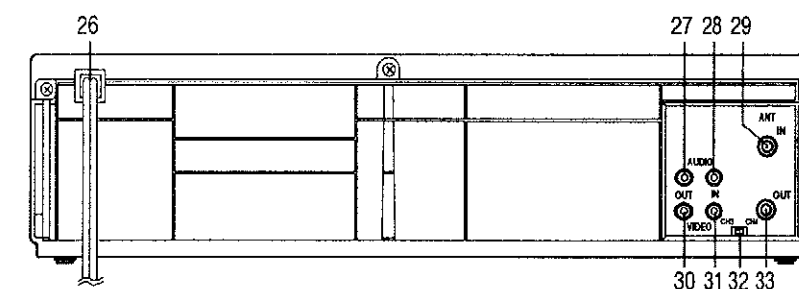
Press to stabilize the picture in the Still mode when the picture begins to vibrate vertically.

10. REC button—Press for manual recording.

IRT button—Press to activates Instant Recording Timer. (only on the VCR)

Models : VT-MX431A/MX431AC

—Rear View—



11. NUMBER buttons—Press to select desired channels for viewing or recording. To select channels from 1 to 9, first press "0" button then 1 to 9. (only on the remote control)

+100 button—When selecting cable channels which are higher than 99, press this button first, then press the last two digits. (To select channel 125, first press "+100" button then press "2" and "5"). (only on the remote control)

ENTER(only on the remote control)

12. MENU button—Press to display the menus on the TV screen. Press to exit the menus on the TV screen. (only on the remote control)

13. DISPLAY button—Press to display the counter or the current channel number and the current time on the TV screen. (only on the remote control)

14. TAPE SPEED button—Press to choose the desired recording speed : SP/LP/SLP. (only on the remote control)

15. QUICK-FIND button—Quick Find mode. (only on the remote control)

16. COUNTER RESET button—Press to reset counter to 0:00:00. (only on the remote control)

EXIT button—Press to exit the menus on the TV screen. (only on the remote control)

17. COUNTER MEMORY button—Press to set counter memory on and off. (only on the remote control)

18. TIME SEARCH button—Time Search mode. (only on the remote control)

19. INDEX SEARCH button—Index Search mode. (only on the remote control)

20. PAUSE button—Press to temporarily stop the tape during recording or to view a still picture during playback. (only on the remote control)

Frame Advance function—Press to advance the picture by one frame at a time during the still mode. (only on the remote control)

21. SLOW button—Press to start slow motion playback. The slow speed can be controlled by pressing the F.FWD button (faster) or the REW button (slower). (only on the remote control)

22. VOL(ume) buttons— Press to adjust the desired TV's volume level by using either ▲ or ▼ button. (only on the remote control)

23. MUTE button— Press to mute the TV's sound. Press it again to resume the sound. (only on the remote control)

24. VCR/TV button—Press to select TV or VCR mode. (only on the remote control)

VCR position: to view playback, to monitor video recordings or watch TV using the VCR tuner.

TV position: to watch TV or to view one program while recording another.

25. MODE SELECT buttons (only on the remote control)

CATV button

TV button

VCR button

26. Power cord—Connect to a standard AC outlet (120V/60Hz).

27. AUDIO OUT jack—Connect to the audio input jack of your audio equipment or another VCR.

28. AUDIO IN jack—Connect to the audio output jack of your audio equipment or another VCR.

29. ANT. IN terminal—Connect to an antenna, Cable system or Satellite system.

30. VIDEO OUT jack—Connect to the video input jack of your video camera or another VCR.

31. VIDEO IN jack—Connect to the video output jack of your video camera or another VCR.

32. CH3/CH4 selector switch—Use to select a video output channel (3 or 4) for VCR playback.

33. ANT. OUT terminal—Connects to the antenna input terminal on your TV.

ELECTRICAL ADJUSTMENT INSTRUCTIONS

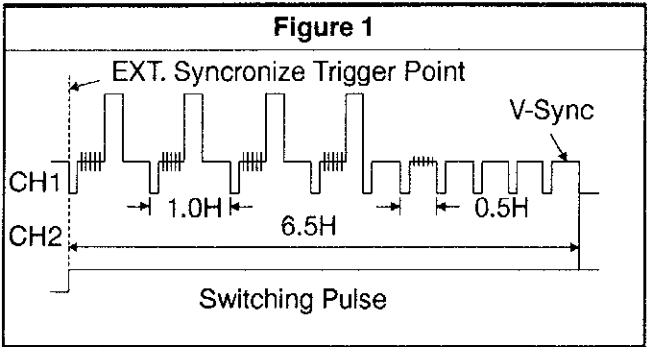
General Note: "CBA" is an abbreviation for "Circuit Board Assembly."

NOTE:

- 1. Electrical adjustments are required after replacing circuit components and certain mechanical parts. It is important to do these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.
- 2. To perform these alignment / confirmation procedures, make sure that the tracking control is set in the center position: Press either channel "▼" or "▲" button first, then the "PLAY" button(VCR's Front Panel only).

Test Equipment Required

- 1. Oscilloscope: Dual-trace with 10:1 probe, V-Range: 0.001~50V/Div., F-Range: DC~AC-20MHz
- 2. Alignment Tape (MH-1)



Reference Notes:

Play back the Alignment tape and adjust VR501 so that the V-sync front edge of the CH1 video output waveform is out the 6.5H(412.7μs) delayed position from the rising edge of the CH2 head switching pulse waveform.

Head Switching Position Adjustment

Purpose:

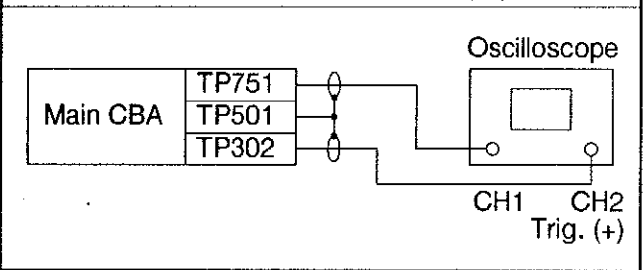
To determine the Head Switching point during play-back.

Symptom of Misadjustment:

May cause Head Switching noise or vertical jitter in the picture.

Test Point	Adj. Point	Mode	Input
TP751(V-OUT) TP302(RF-SW) TP501(GND)	VR501 (Switching Point) (MAIN CBA)	PLAY (SP)	---
Tape	Measurement Equipment	Spec.	
MH-1	Oscilloscope	6.5H±1H (412.7μs±60μs)	

Connections of Measurement Equipment

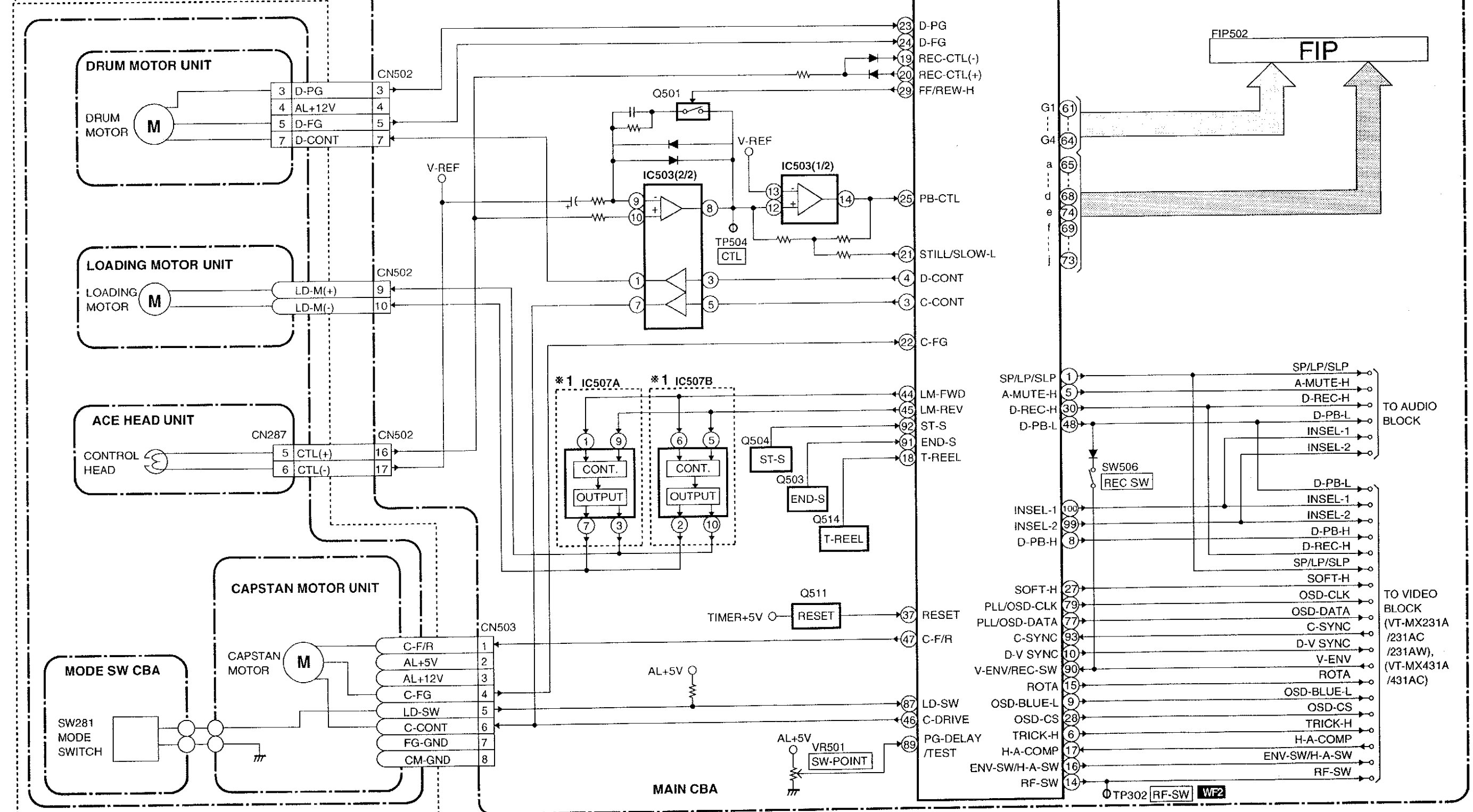


BLOCK DIAGRAMS

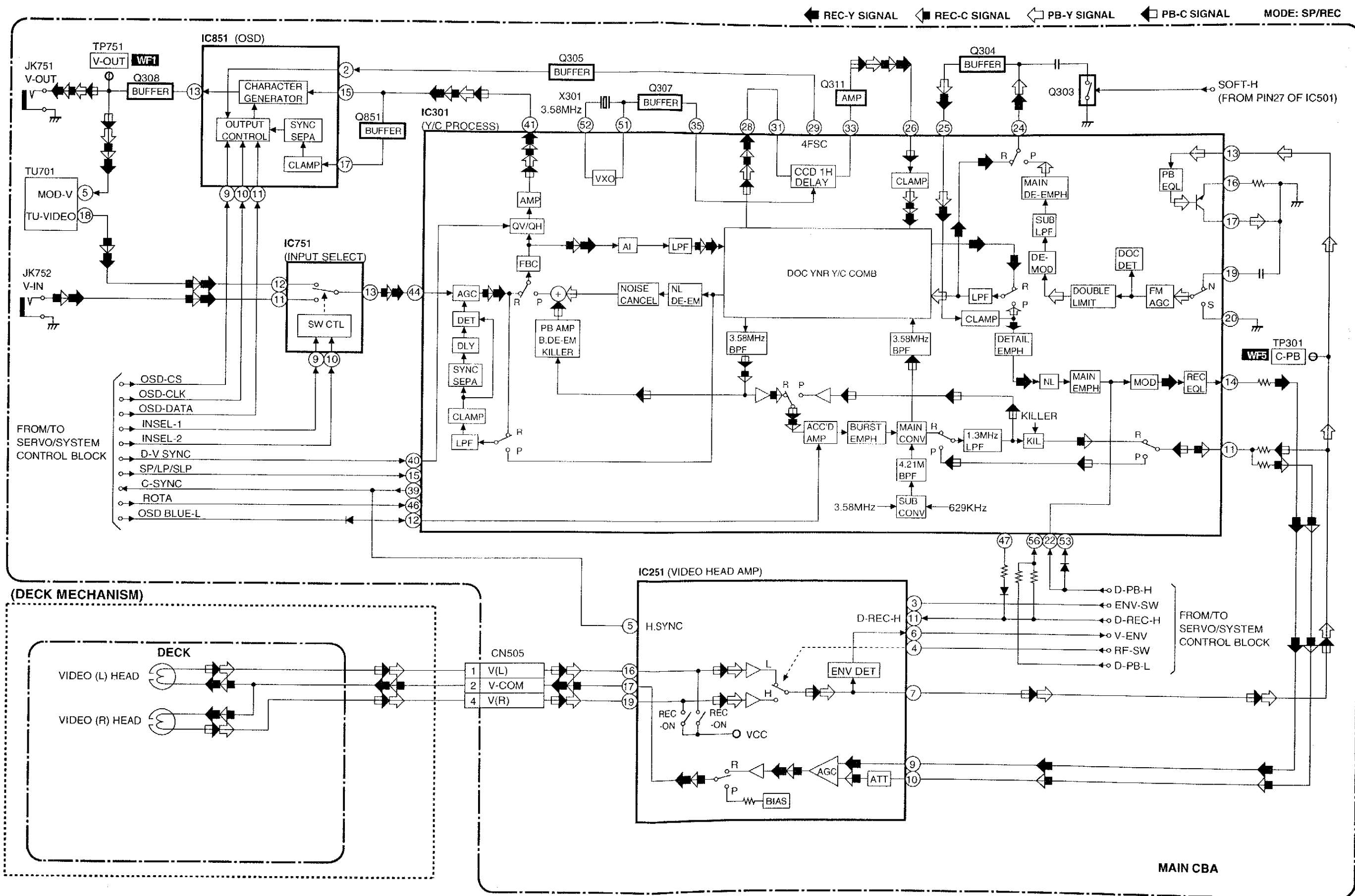
Servo/System Control Block Diagram

* 1 NOTE: The loading motor drive IC is either IC507A(TA7291S) or IC507B(LB1641). These ICS are exchangeable parts.

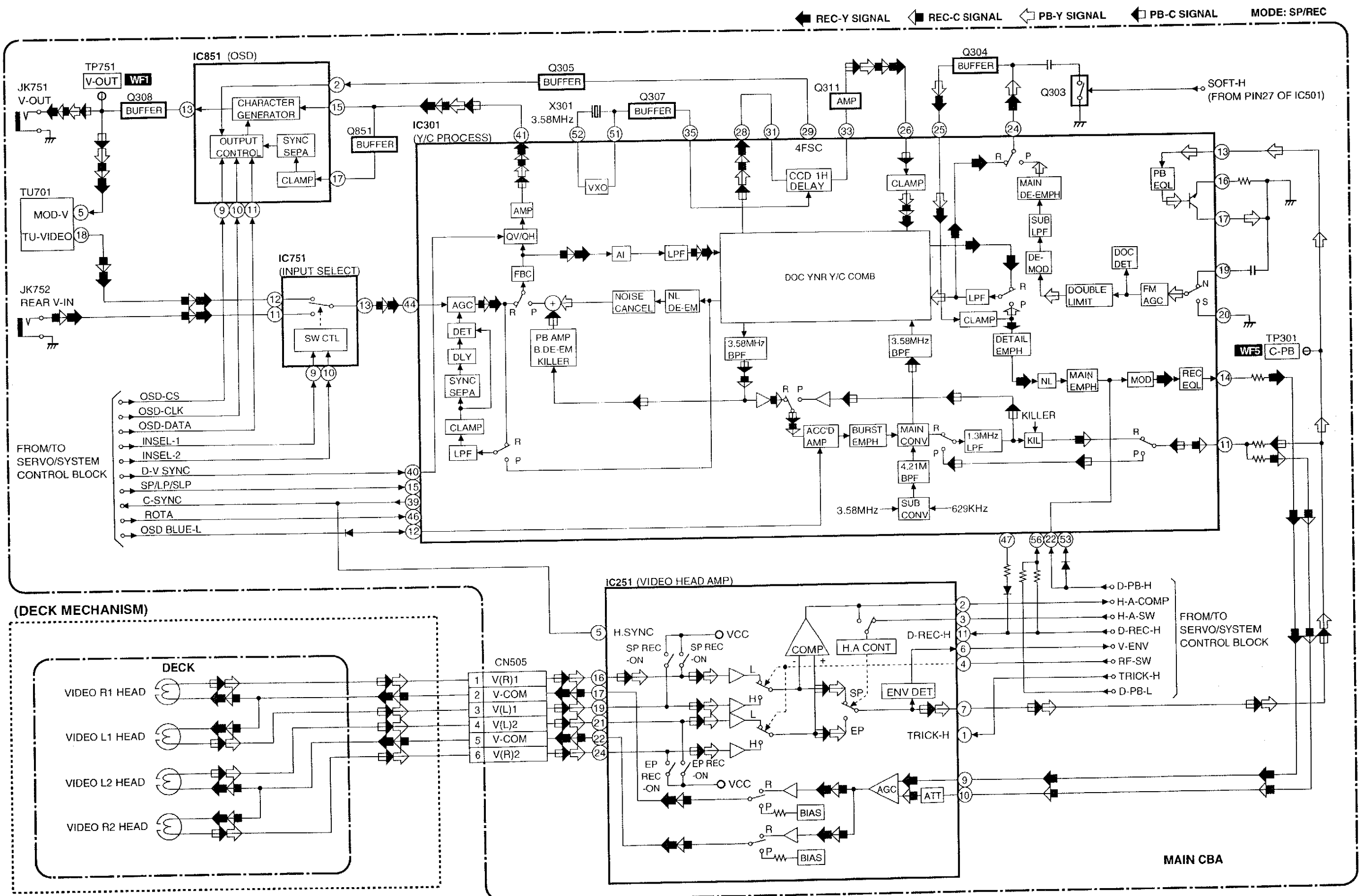
(DECK MECHANISM)



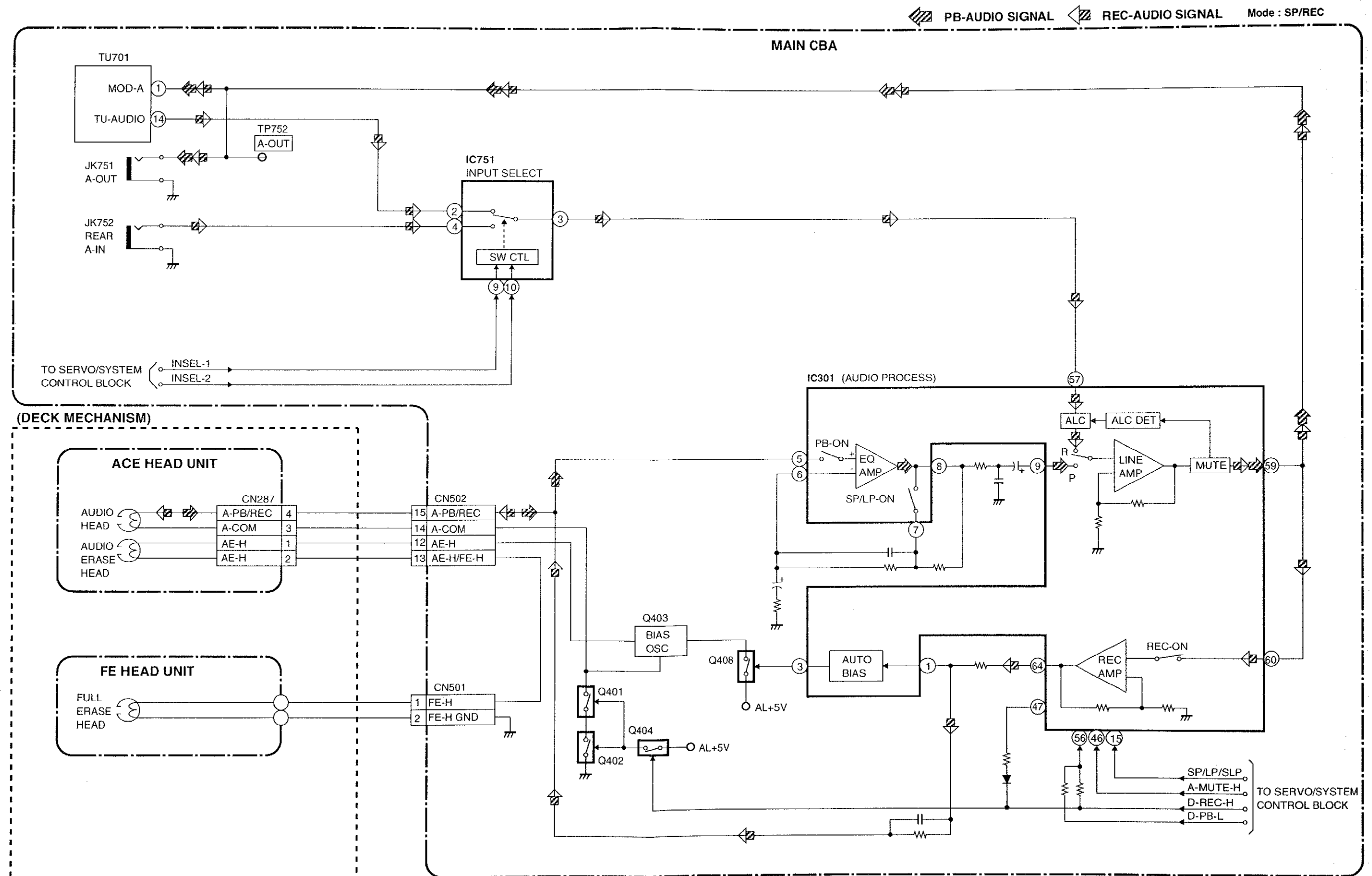
Video Block Diagram (VT-MX231A/231AC/231AW)



Video Block Diagram (VT-MX431A/431AC)



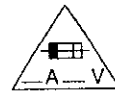
Audio Block Diagram



Power Supply Block Diagram

NOTE :

The voltage for parts in hot circuit is measured using hot GND as a common terminal.



CAUTION

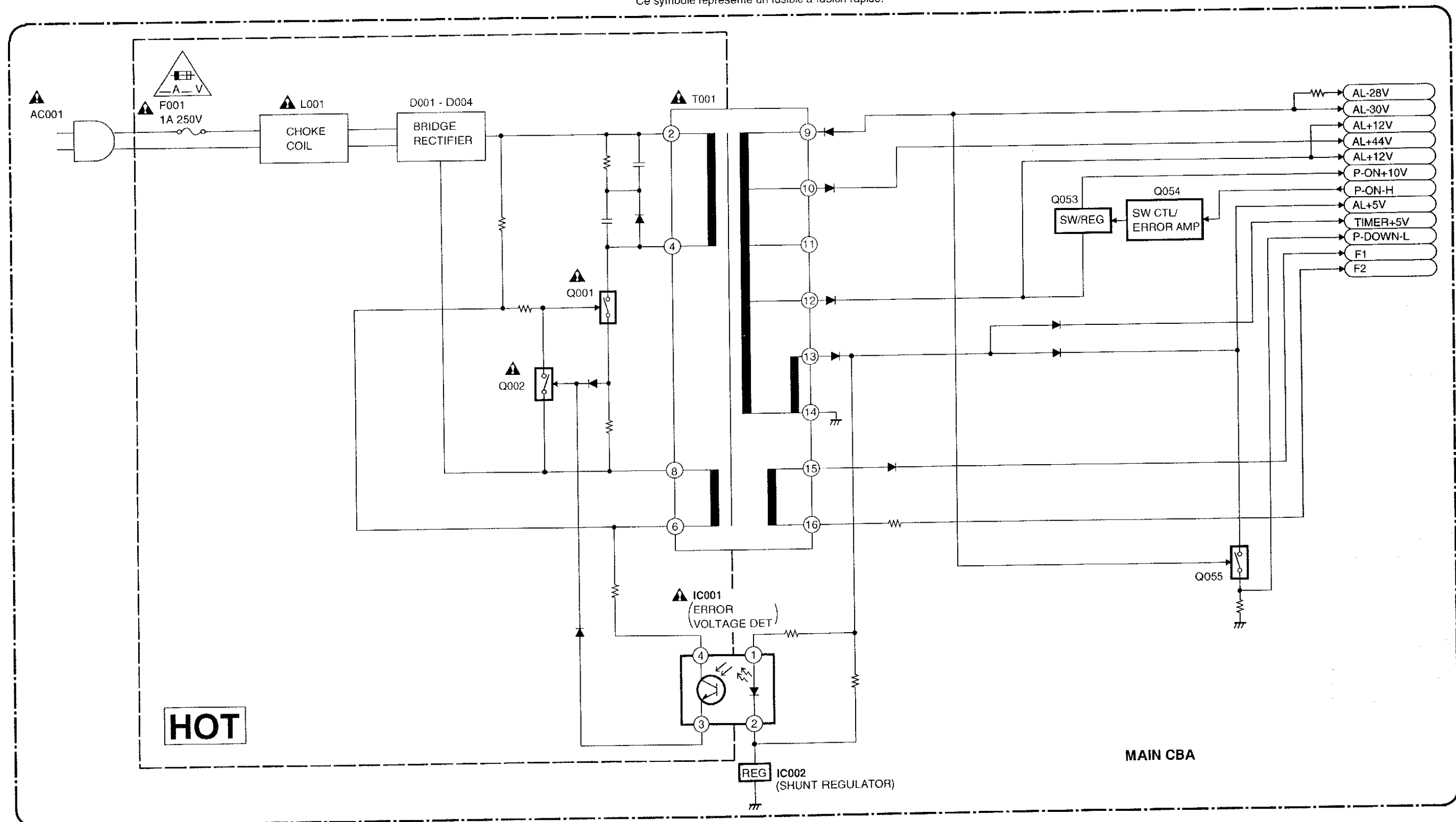
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQUES
D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.

 "This symbol means fast operating fuse."

"Ce symbole représente un fusible à fusion rapide."

CAUTION!

CAUTION! Fixed voltage (and Auto voltage) power supply circuit is used in this unit. If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.



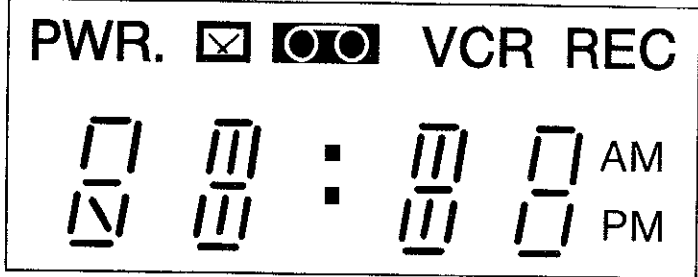
Function Indicator Symbols

Note:

The following symbols will appear on the indicator panel to indicate the current mode or operation of the VCR. On-Screen modes will also be momentarily displayed on the TV screen when you press the operation buttons.

Display panel

Note: Briefly (5 seconds) displays which feature the VCR is currently performing.



- PL AY Playback
- FF Fast forward
- RE W Rewind
- ST OP Stop
- REC Recording
- [09 Tuning

LED MODE	INDICATOR ACTIVE	
CASSET "IN"		ON
CASSET "OUT"		OFF
VCR/TV VCR MODE	" VCR "	ON
VCR/TV TV MODE	" VCR "	OFF
CLOCK	" 88:88 "	ON
	" AM " " PM "	ON
POWER ON	" PWR "	ON
REC	" REC "	ON
REC PAUSE	" REC "	Blinks at 0.8Hz interval
T-REC, OTR		ON (T-REC OFF, T-REC incomplete Blinks at 0.8Hz interval)
AUTE RETURN		Blinks at 0.8Hz interval)
When Reel and Capstan Mechanism is Not Functioning Correctly	" No. 1(grid 1)	Blinks at 0.8Hz interval
When Tape Loading Mechanism is Not Functioning Correctly	" No. 2(grid 1)	Blinks at 0.8Hz interval
When Cassette Loading Mechanism is Not Functioning Correctly	" No. 3(grid 1)	Blinks at 0.8Hz interval
When the Drum is Not working properly	" No. 4(grid 1)	Blinks at 0.8Hz interval
S-INH CONDITION	ALL MODE	Blinks at 0.8Hz interval

SCHEMATIC DIAGRAMS / CBA'S AND TEST POINTS

Standard Notes

Warning

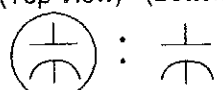
Many electrical and mechanical parts in this chassis have special characteristics. These characteristics often pass unnoticed and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts that have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by the mark "▲" in the schematic diagram and the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts that do not have the same safety characteristics as specified in the parts list may create shock, fire, or other hazards.

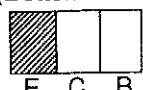
Capacitor Temperature Markings

Mark	Capacity change rate	Standard temperature	Temperature range
(B)	±10%	20°C	-25~+85°C
(F)	+30 -80%	20°C	-25~+85°C
(SR)	±15%	20°C	-25~+85°C
(Z)	+30 -80%	20°C	-10~+70°C

Capacitors and transistors are represented by the following symbols.

CBA Symbols

(Top View) (Bottom View)
 : Electrolytic Capacitor

(Bottom View)
 : Transistor or Digital Transistor

(Top View)
 NPN Transistor

(Top View)
 PNP Transistor

(Top View)
 NPN Digital Transistor

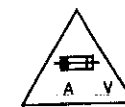
(Top View)
 PNP Digital Transistor

Note:

- Do not use the part number shown on these drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since these drawings were prepared.
- All resistance values are indicated in ohms ($K=10^3$, $M=10^6$).
- Resistor wattages are 1/4W or 1/6W unless otherwise specified.
- All capacitance values are indicated in μF ($P=10^{-6}\mu F$).
- All voltages are DC voltages unless otherwise specified.

LIST OF CAUTION, NOTES, AND SYMBOLS USED IN THE SCHEMATIC DIAGRAMS ON THE FOLLOWING PAGES:

1. CAUTION:



FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.
 ATTENTION: POUR UNE PROTECTION CONTINUE LES RISQUES D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
 RISK OF FIRE-REPLACE FUSE AS MARKED.

2. CAUTION:



This symbol means fast operating fuse.
 Ce symbole représente un fusible à fusion rapide.

Fixed Voltage (or Auto voltage selectable) power supply circuit is used in this unit.
 If Main Fuse (F001) is blown, first check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

3. Note:

- Do not use the part number shown on the drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since the drawings were prepared.
- To maintain original function and reliability of repaired units, use only original replacement parts which are listed with their part numbers in the parts list section of the service manual.

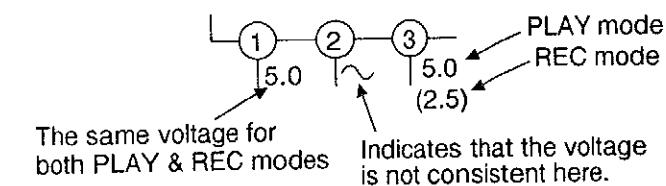
4. Wire Connectors

- Prefix symbol "CN" means "connector" (can disconnect and reconnect).
- Prefix symbol "CL" means "wire-solder holes of the PCB" (wire is soldered directly).

5. Note: Mark "•" is a leadless (chip) component.

6. Mode: SP/REC

7. Voltage indications for PLAY and REC modes on the schematics are as shown below:



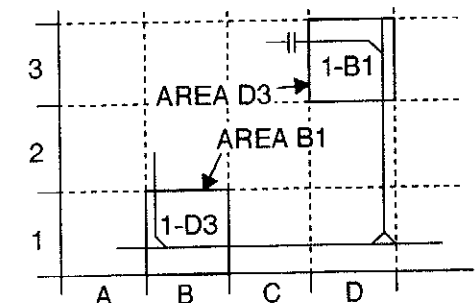
Unit: Volts

8. How to read converged lines

1-D3
 Distinction Area
 Line Number
 (1 to 3 digits)

Examples:

- "1-D3" means that line number "1" goes to area "D3".
- "1-B1" means that line number "1" goes to area "B1".



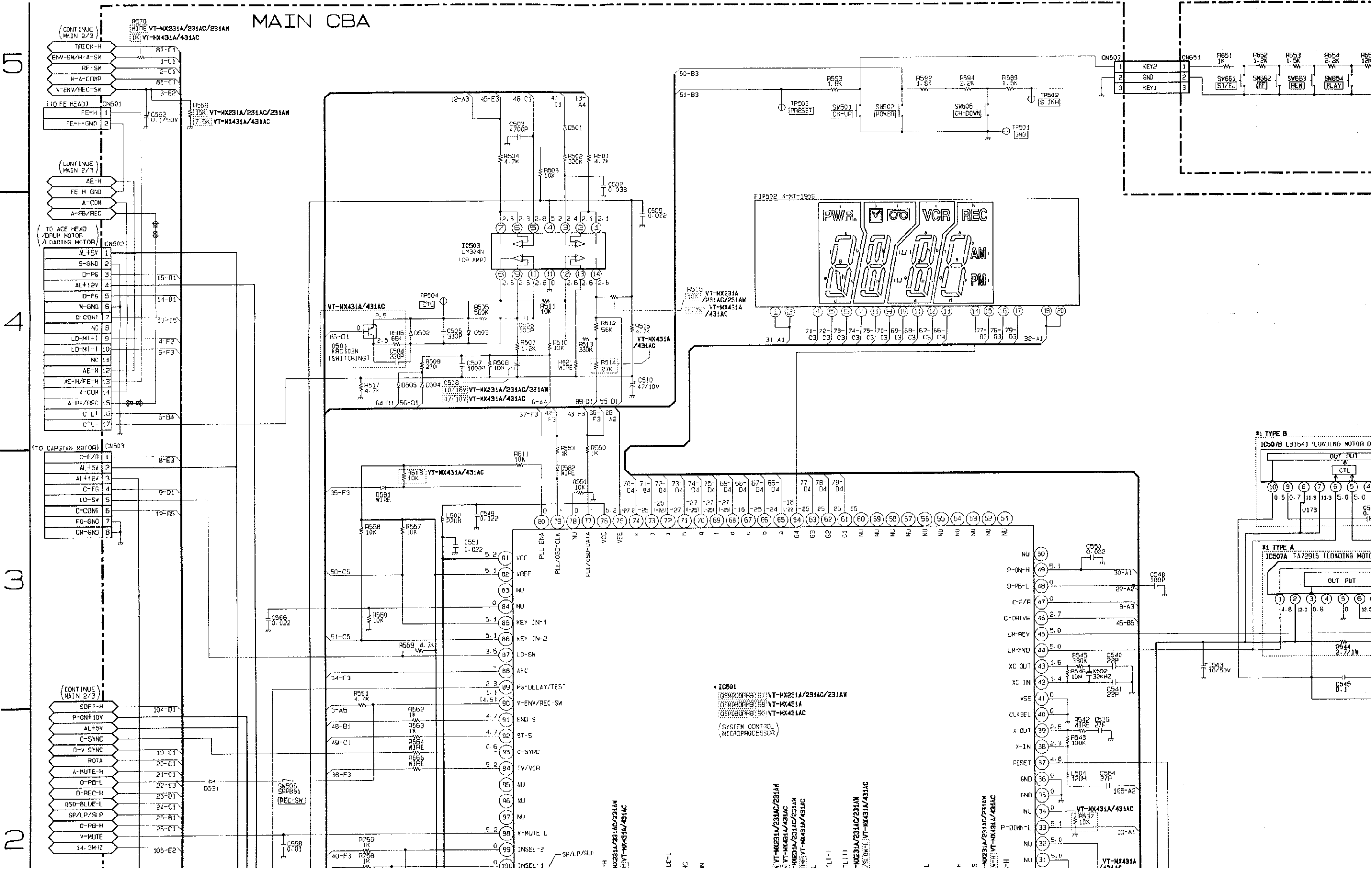
9. Test Point Information

-  : Indicates a test point with a jumper wire across a hole in the PCB.
-  : Used to indicate a test point with a component lead on foil side.
-  : Used to indicate a test point with no test pin.
-  : Used to indicate a test point with a test pin.

Main 1/3 Schematic Diagram

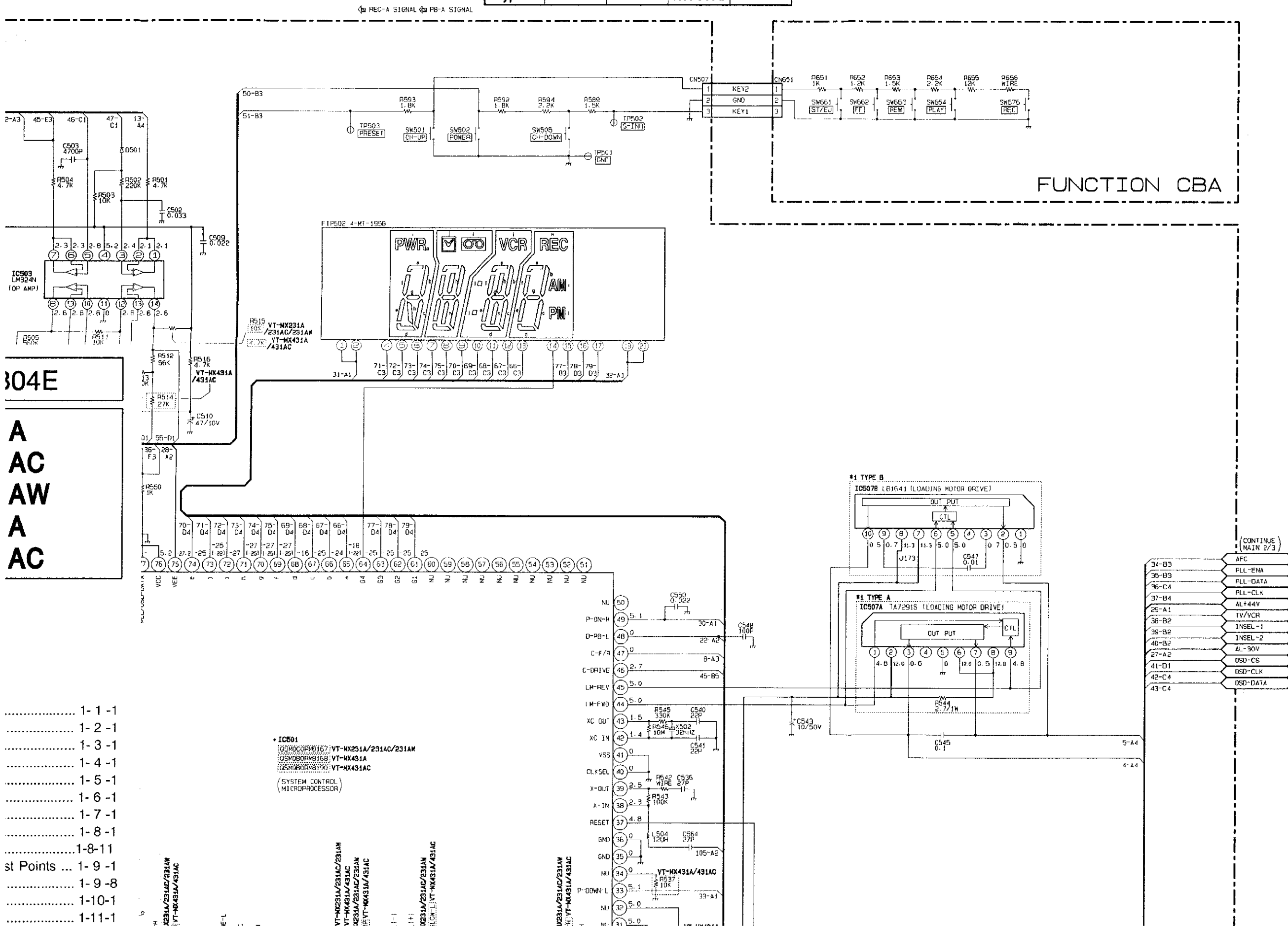
*1 Note:
The loading motor drive IC is either type A or type B.
These two types are exchangeable and can be equally used
whichever the model is. The difference between type A and
type B is shown in the table below.

	IC507A	IC507B	R544	C547
Type A	TA7291S	Not Used	2.7/1W	Not Used
Type B	Not Used	LB1641	Not Used	0.01uF

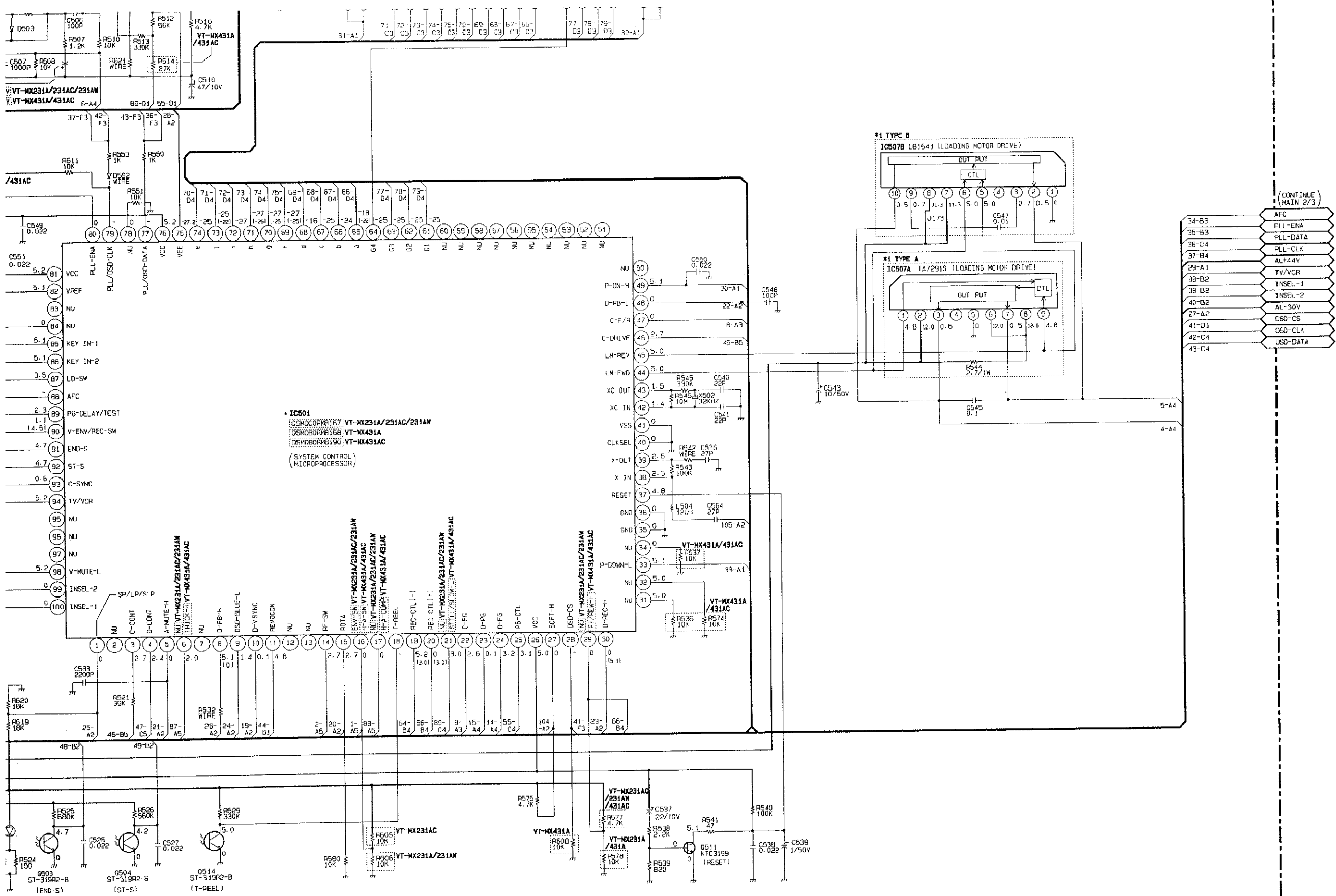


The loading motor drive IC is either type A or type B. These two types are exchangeable and can be equally used whichever the model is. The difference between type A and type B is shown in the table below.

	IC507A	IC507B	R544	C547
Type A	TA7291S	Not Used	2.7/1W	Not Used
Type B	Not Used	LB1641	Not Used	0.01uF







SYSCON/TIMER/SERVO BLOCK

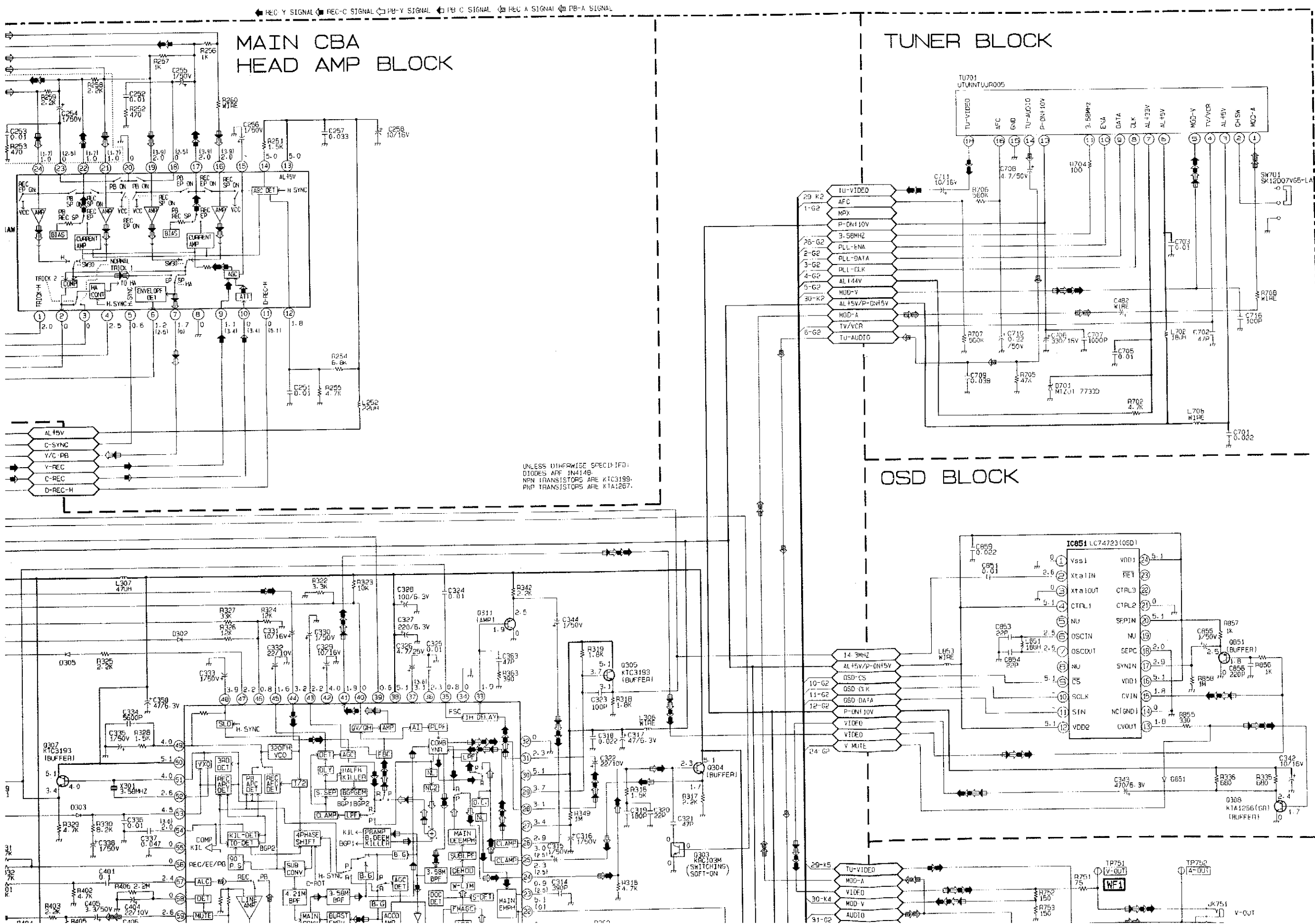
UNLESS OTHERWISE SPECIFIED:
DIODES ARE 1N4148;
SWITCHES ARE KSM0514B.

5



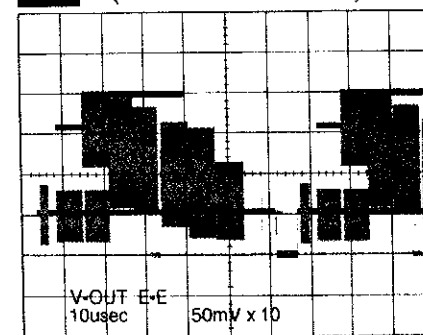
3

2

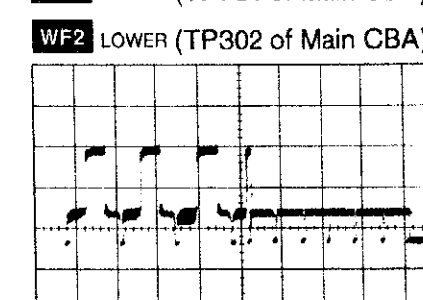


Waveforms

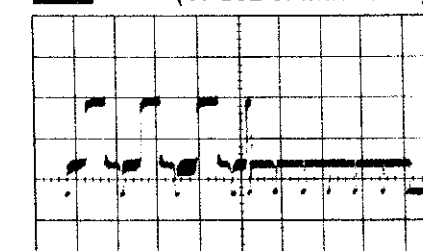
WF1 (TP751 of Main CBA)

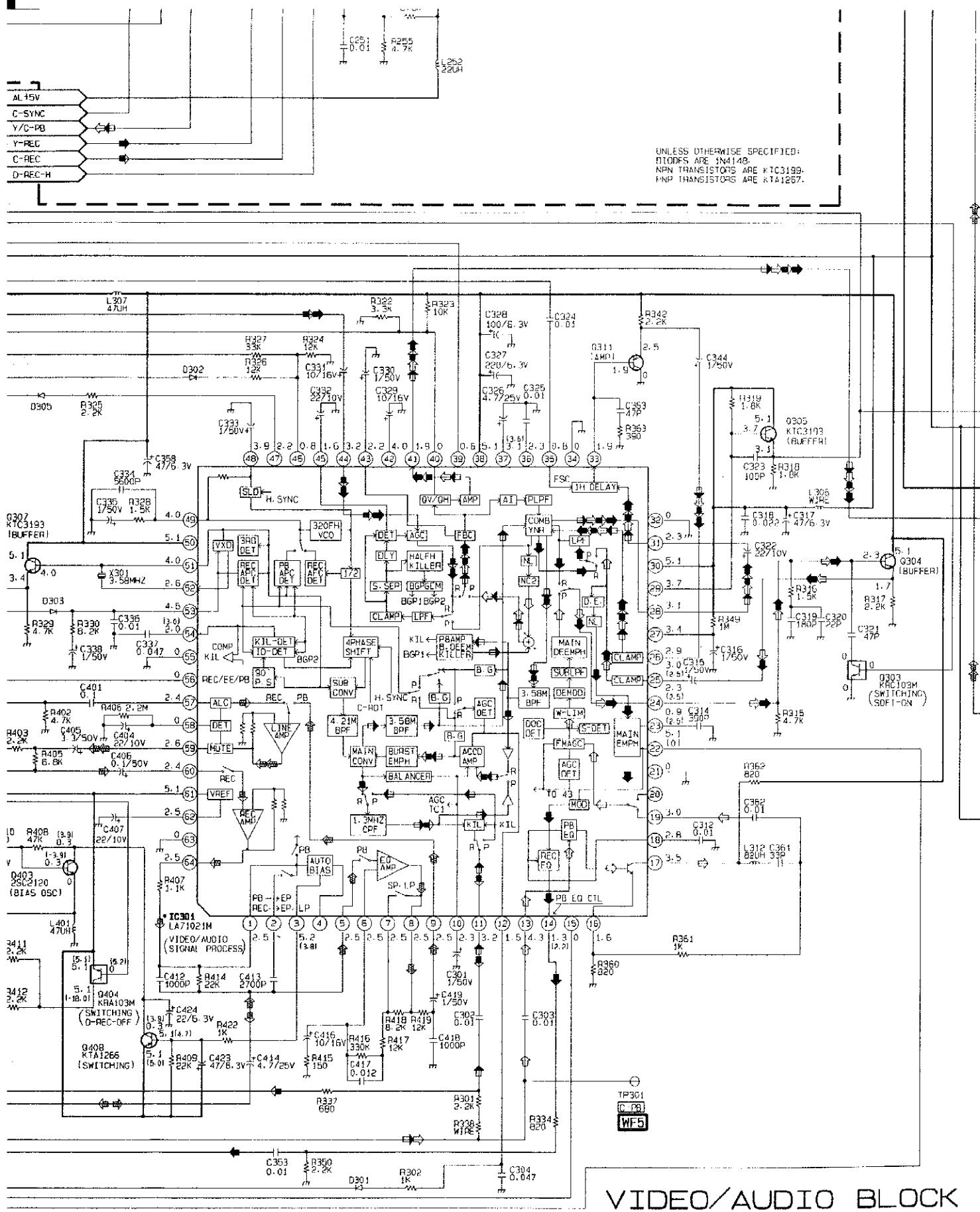


WF1 UPPER (TP751 of Main CBA)



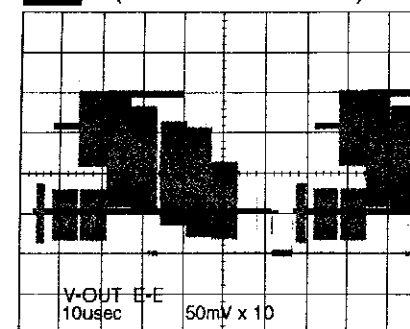
WF2 LOWER (TP302 of Main CBA)





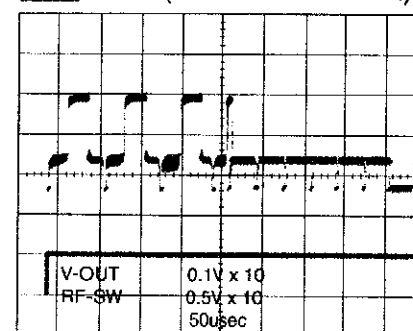
Waveforms

WF1 (TP751 of Main CBA)



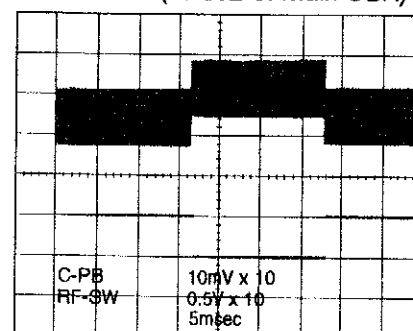
WF1 UPPER (TP751 of Main CBA)

WF2 LOWER (TP302 of Main CBA)



WF5 UPPER (TP301 of Main CBA)

WF2 LOWER (TP302 of Main CBA)



Main 3/3 Schematic Diagram (VT-MX231A/231AC/431A/431AC)

CAUTION !
Fixed voltage (and Auto voltage) power supply circuit is used in this unit.
If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
Otherwise it may cause some components in the power supply circuit to fail.

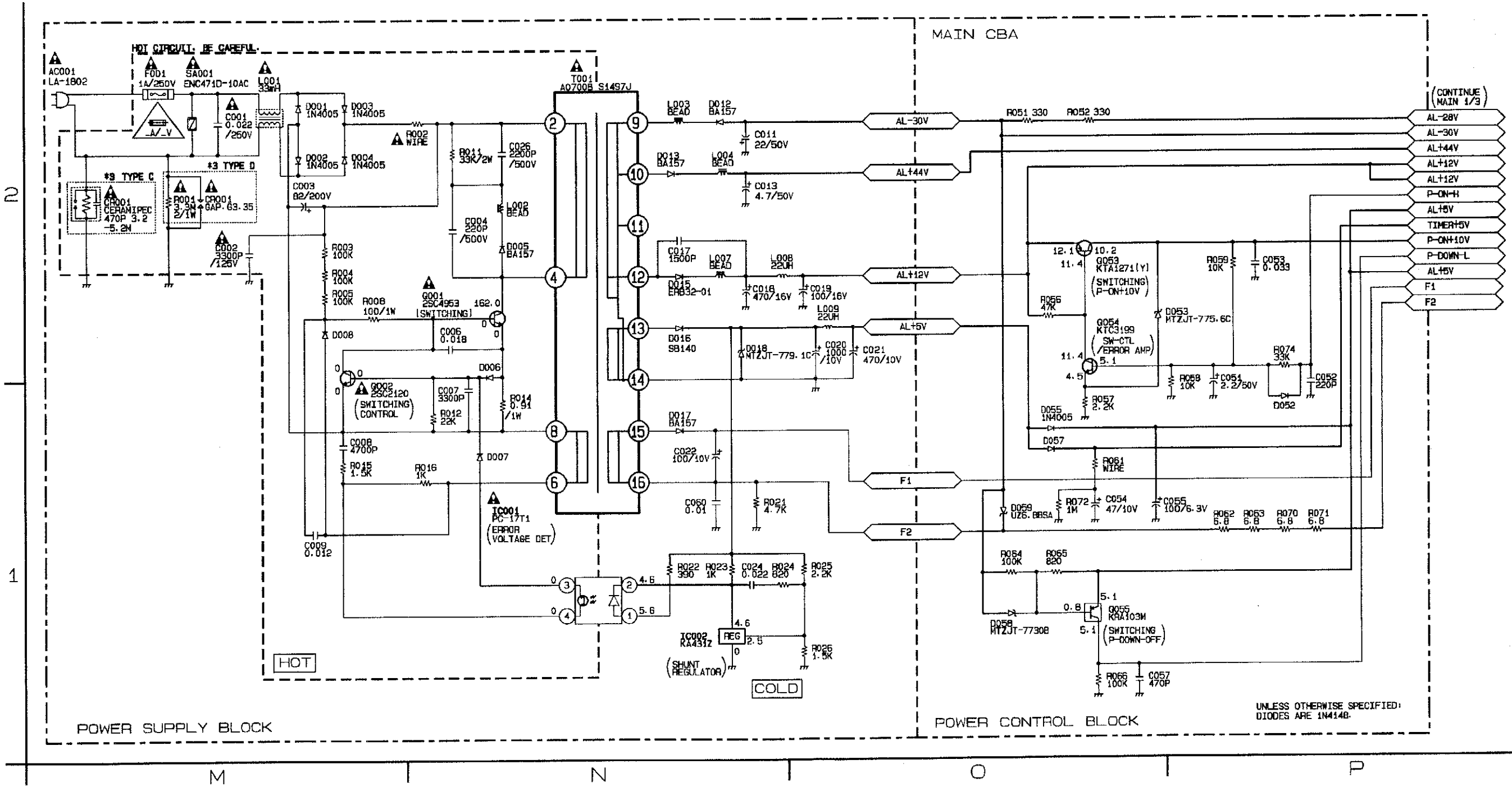


CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQUES
D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.
This symbol means fast operating fuse.
"Ce symbole représente un fusible à fusion rapide."

***3 Note:**
CR001 is either Type C or Type D.
The difference between Type C and Type D is shown in the below.

	CR001	R001
Type C	GAP	3.3M 1/2W
Type D	CERAMIEPEC	Not Used

NOTE:
The voltage for parts in hot circuit is measured using
hot GND as a common terminal.



Main 3/3 Schematic Diagram (VT-MX231AW)

CAUTION !

Fixed voltage (and Auto voltage) power supply circuit is used in this unit.
If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
Otherwise it may cause some components in the power supply circuit to fail.



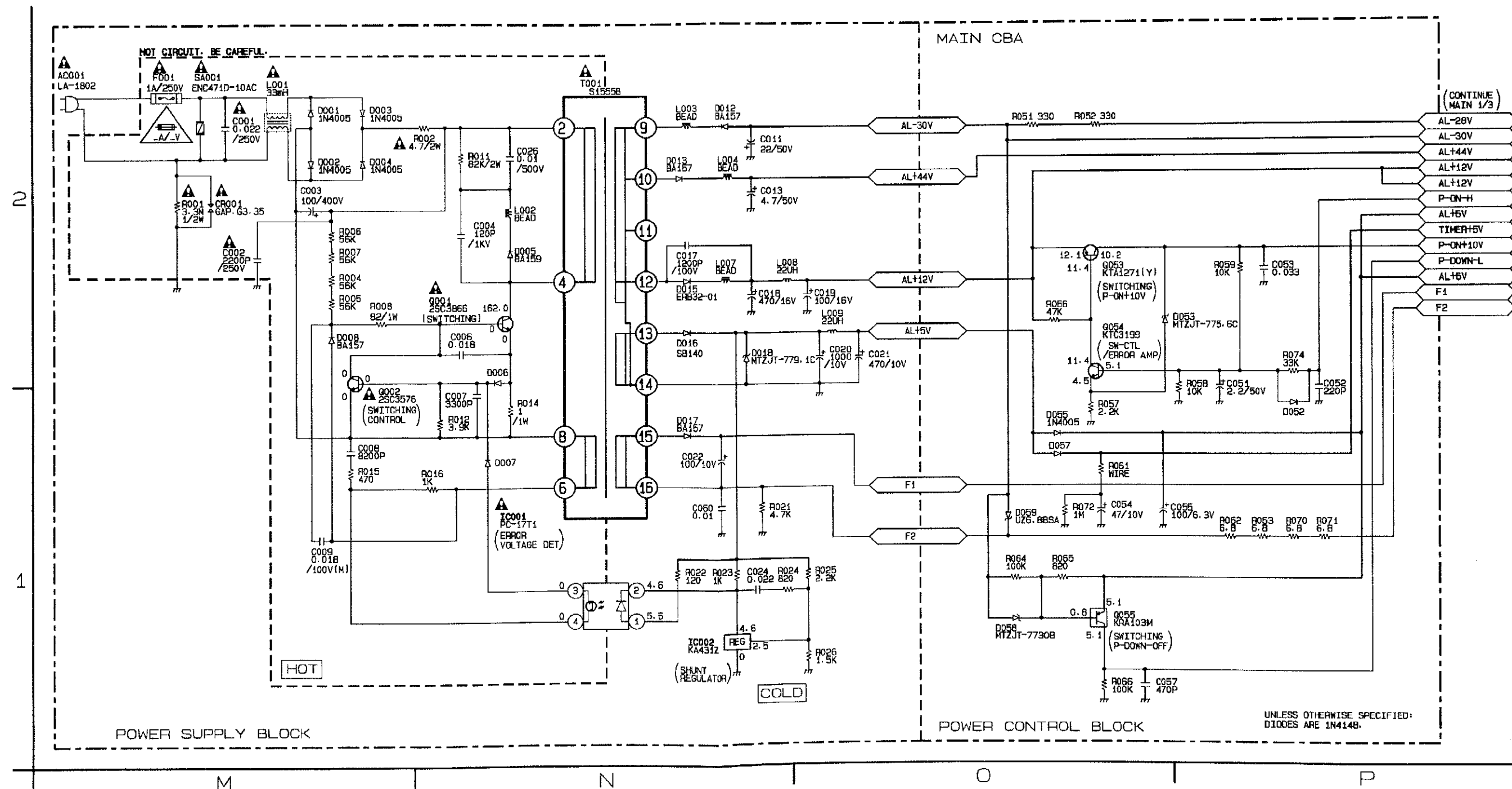
CAUTION

FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQUES
D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.

"This symbol means fast operating fuse."
"Ce symbole représente un fusible à fusion rapide."

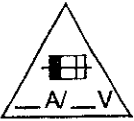
NOTE :

The voltage for parts in hot circuit is measured using
hot GND as a common terminal.



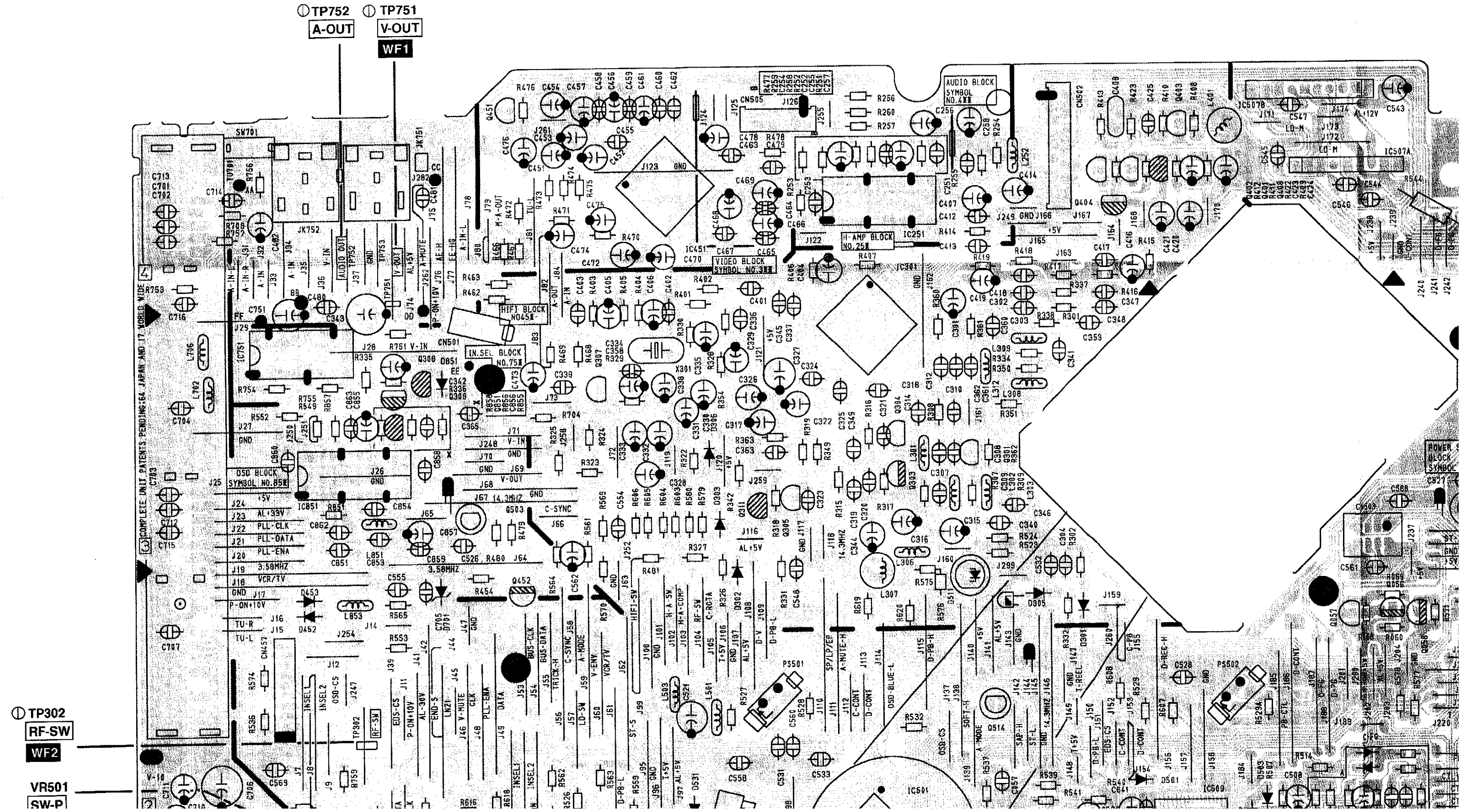
Main CBA Top View

CAUTION !
Fixed voltage (and Auto voltage) power supply circuit is used in this unit.
If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
Otherwise it may cause some components in the power supply circuit to fail.



CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQUES
D'INCENDIE N'UTILISER QUE DES FUSIBLES DE MEME TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.
This symbol means fast operating fuse.
Ce symbole représente un fusible à fusion rapide.

**BECAUSE A HOT CHASSIS GROUND IS PRESENT IN THE POWER
SUPPLY CIRCUIT , AN ISOLATION TRANSFORMER MUST BE USED.
ALSO , IN ORDER TO HAVE THE ABILITY TO INCREASE THE INPUT
SLOWLY , WHEN TROUBLESHOOTING THIS TYPE POWER SUPPLY
CIRCUIT , A VARIABLE ISOLATION TRANSFORMER IS REQUIRED.**



AUTION !

Fixed voltage (and Auto voltage) power supply circuit is used in this unit.
Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
Otherwise it may cause some components in the power supply circuit to fail.

**CAUTION**

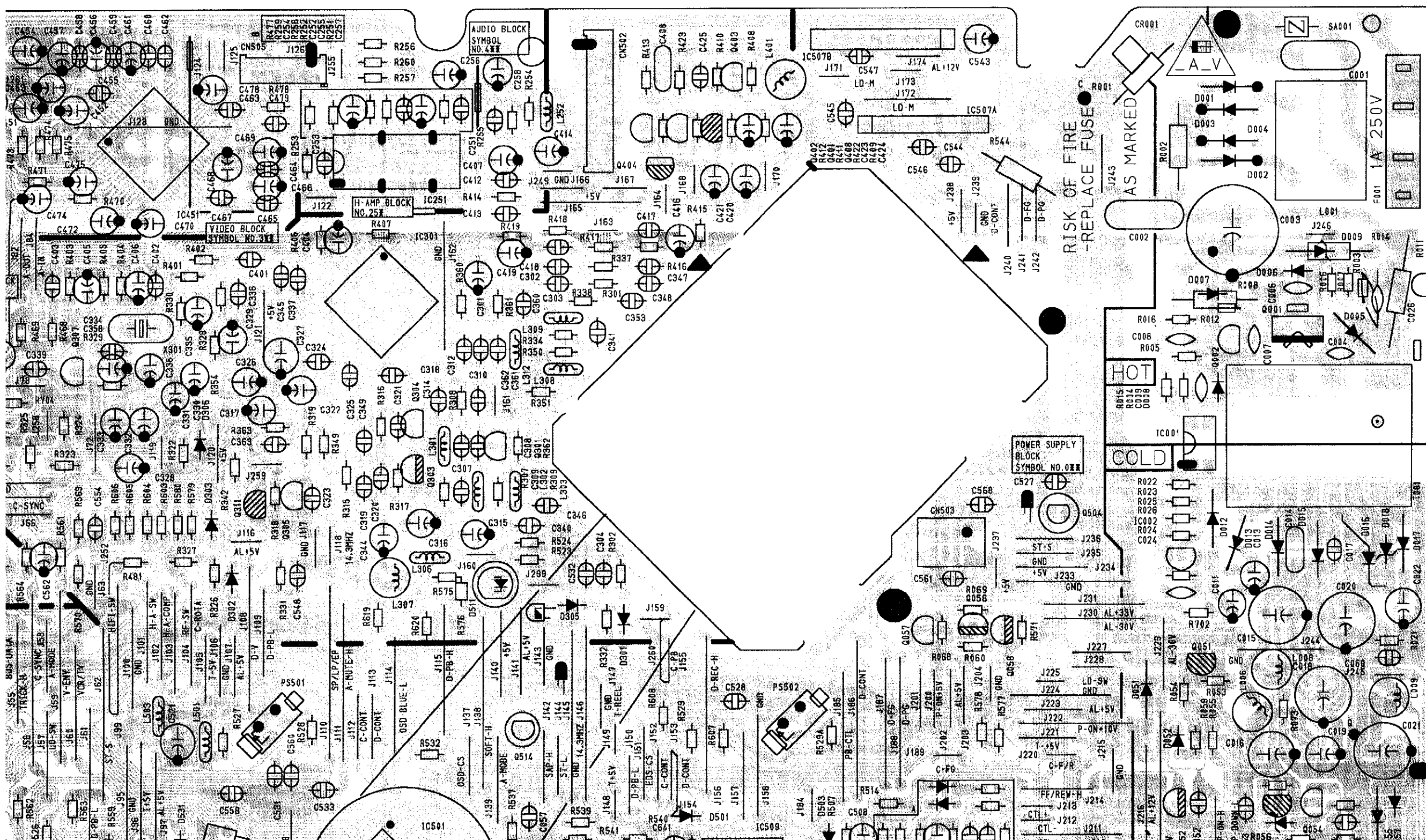
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,
REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQUES
D'INCENDIE N'UTILISER QUE DES FUSIBLE DE MEME TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.

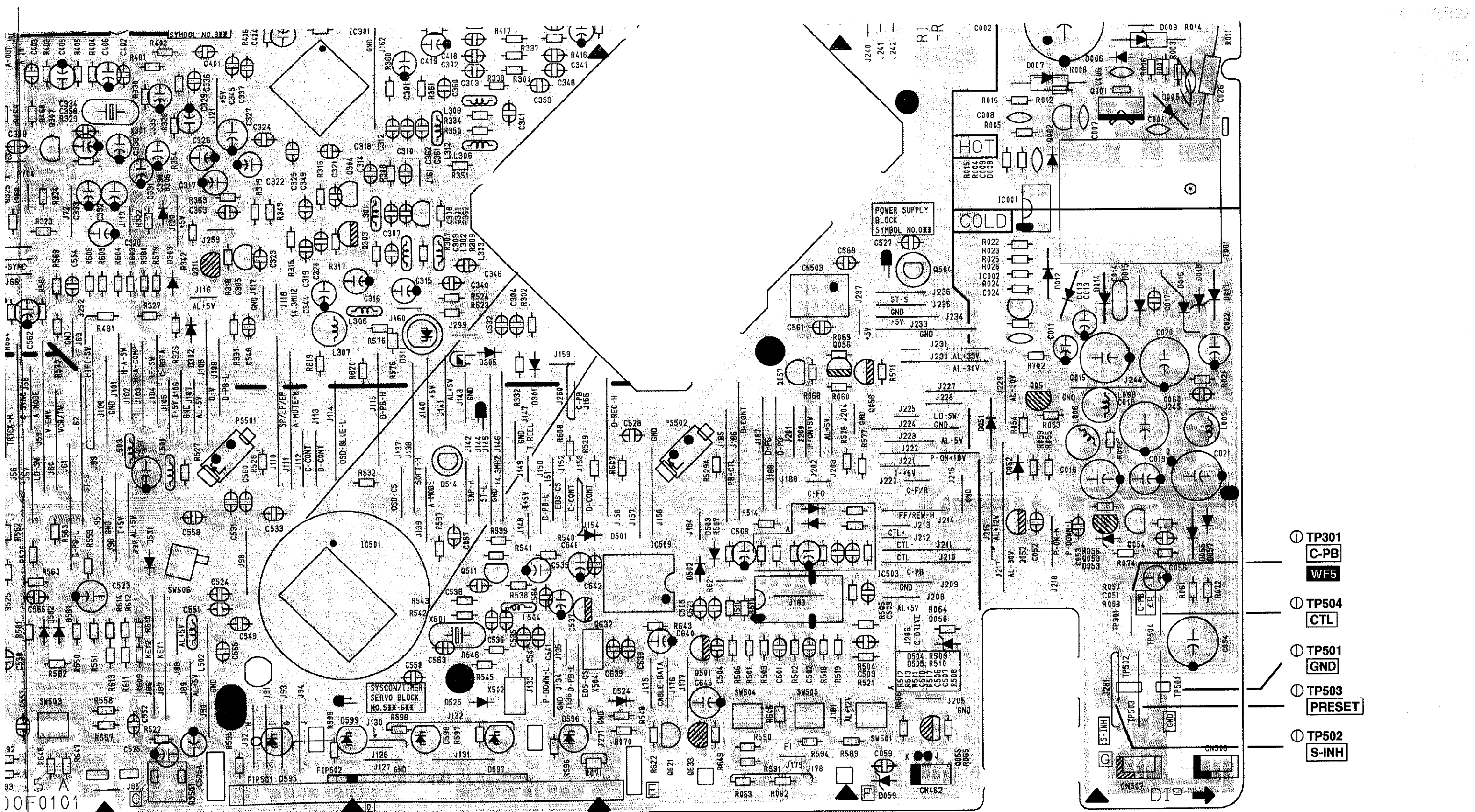
This symbol means fast operating fuse.
Ce symbole représente un fusible à fusion rapide.

NOTE :

The voltage for parts in hot circuit is measured using
hot GND as a common terminal.

**BECAUSE A HOT CHASSIS GROUND IS PRESENT IN THE POWER
SUPPLY CIRCUIT, AN ISOLATION TRANSFORMER MUST BE USED.
ALSO, IN ORDER TO HAVE THE ABILITY TO INCREASE THE INPUT
VOLTAGE, WHEN TROUBLESHOOTING THIS TYPE POWER SUPPLY
CIRCUIT, A VARIABLE ISOLATION TRANSFORMER IS REQUIRED.**

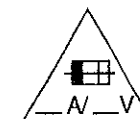




Main CBA Bottom View

CAUTION !

Fixed voltage (and Auto voltage) power supply circuit is used in this unit.
If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
Otherwise it may cause some components in the power supply circuit to fail.



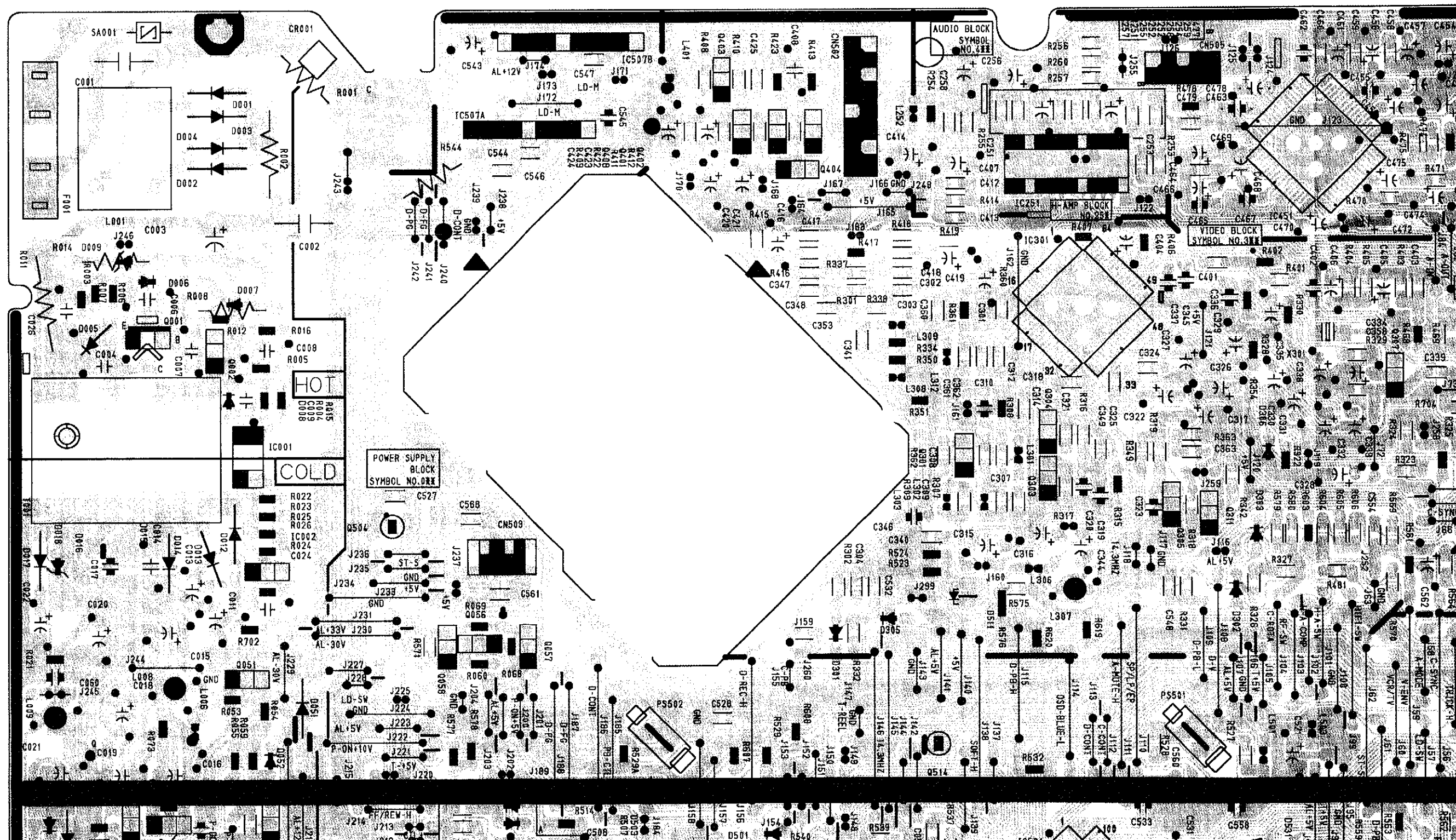
CAUTION

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ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQUES
D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.

"This symbol means fast operating fuse."
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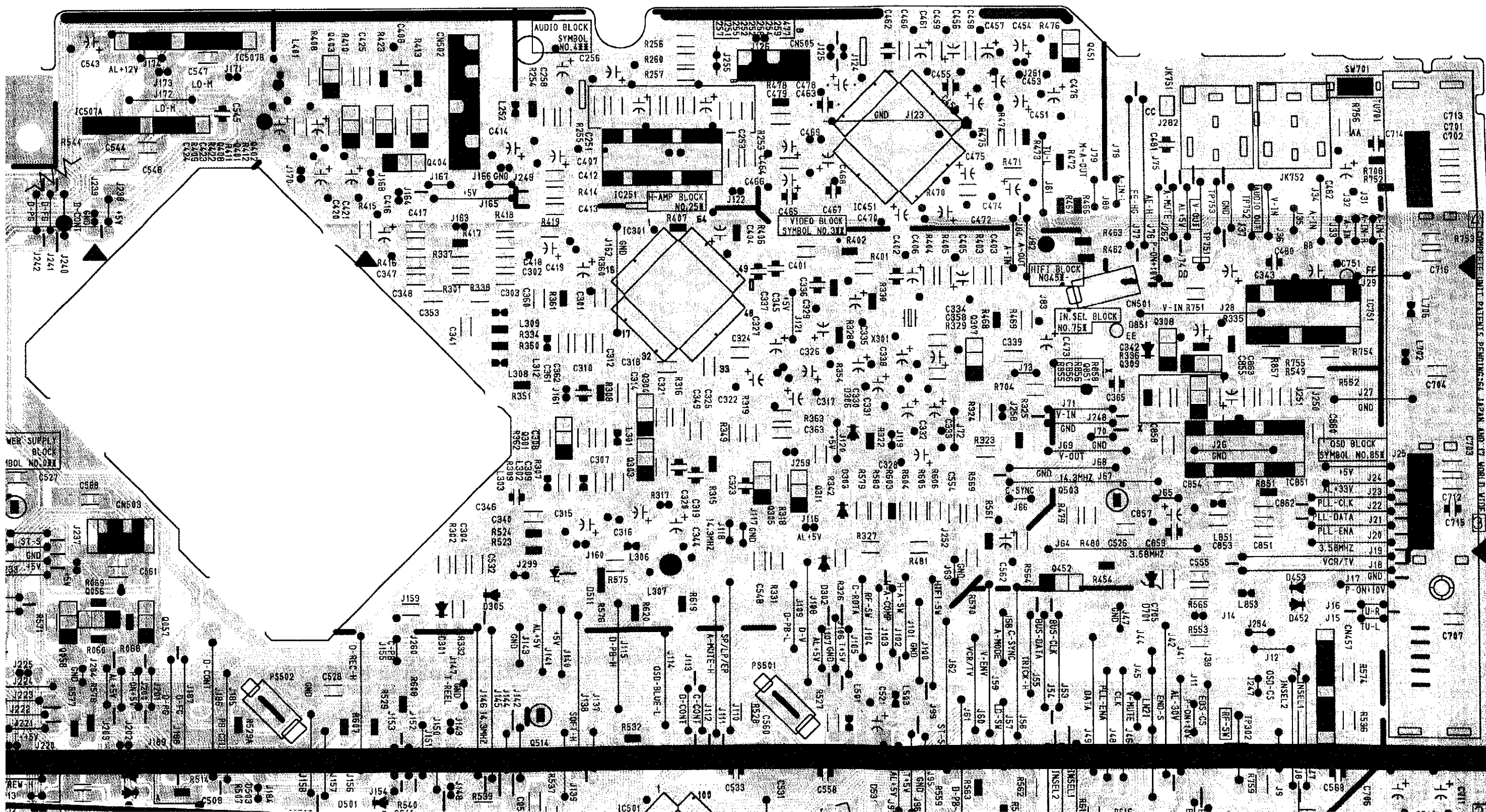
NOTE :
The voltage
hot GND as

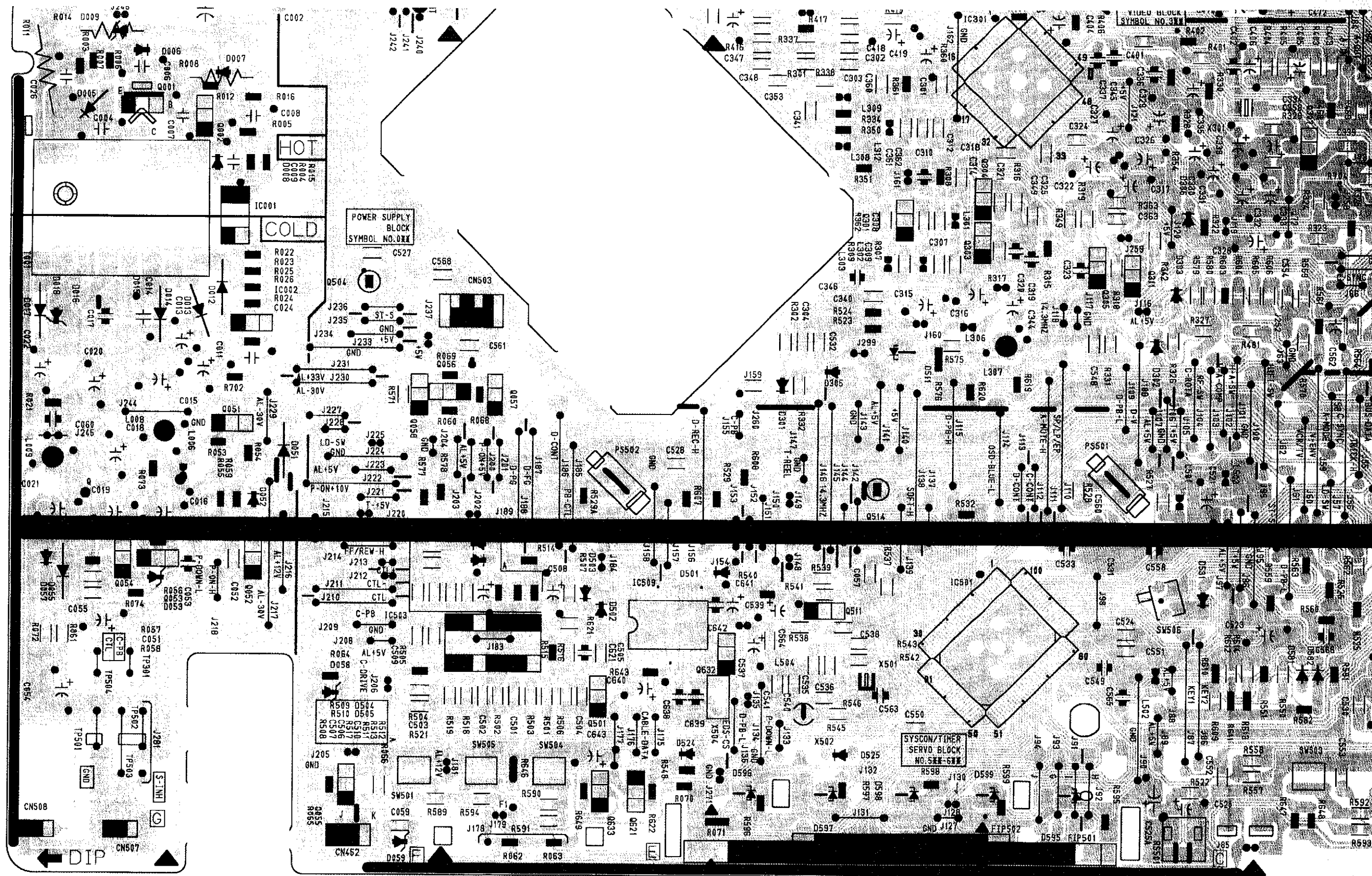
**BECAUSE A HOT CHASSIS GROUND IS PRESENT IN THE POWER
SUPPLY CIRCUIT, AN ISOLATION TRANSFORMER MUST BE USED.
ALSO, IN ORDER TO HAVE THE ABILITY TO INCREASE THE INPUT
SLOWLY, WHEN TROUBLESHOOTING THIS TYPE POWER SUPPLY
CIRCUIT, A VARIABLE ISOLATION TRANSFORMER IS REQUIRED.**



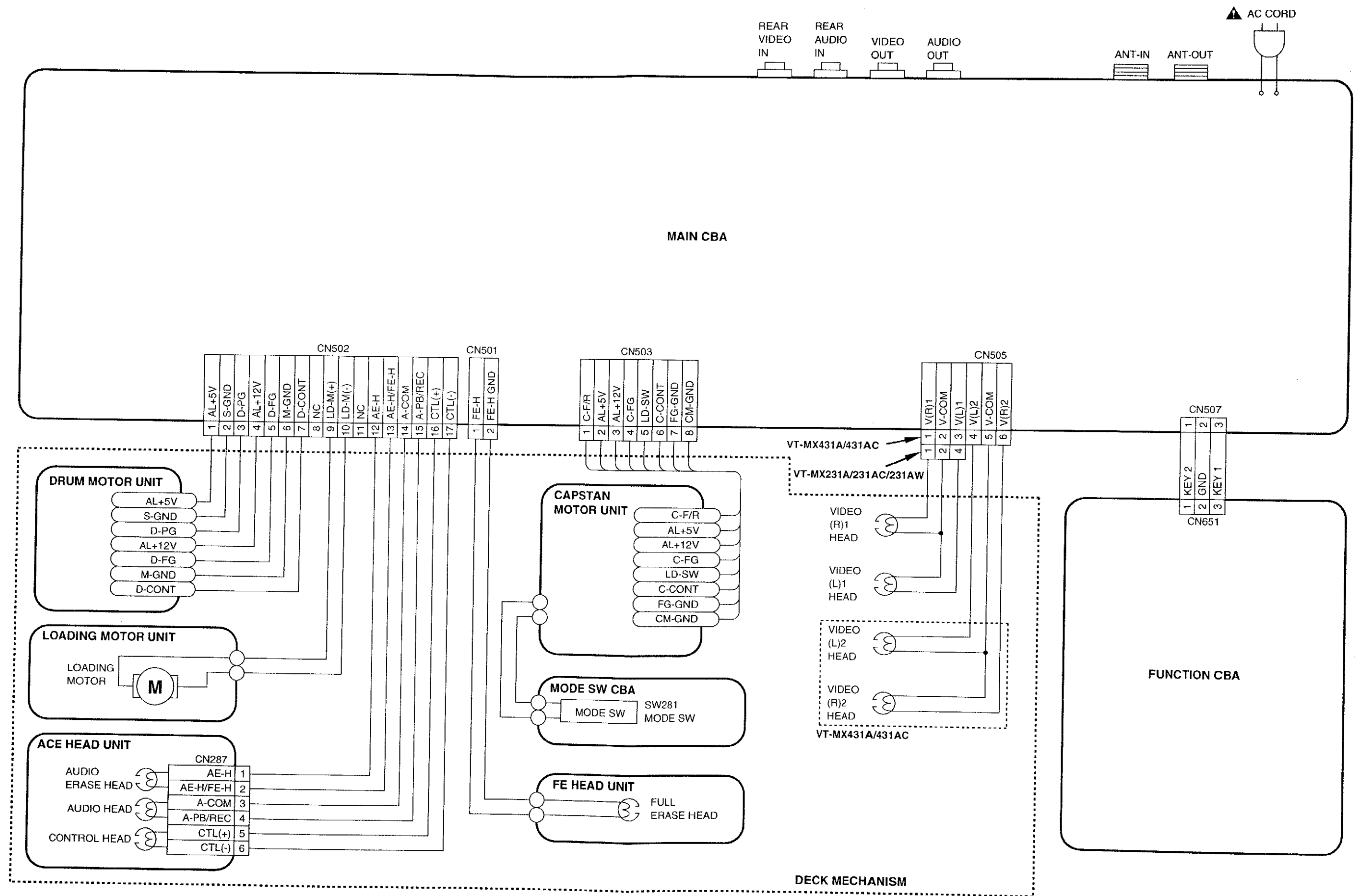
 "This symbol means fast operating fuse."
"Ce symbole représente un fusible à fusion rapide."

**IF CHASSIS GROUND IS PRESENT IN THE POWER
SUPPLY, AN ISOLATION TRANSFORMER MUST BE USED.
NEVER TRY TO HAVE THE ABILITY TO INCREASE THE INPUT
VOLTAGE. FOR TROUBLESHOOTING THIS TYPE POWER SUPPLY
A VARIABLE ISOLATION TRANSFORMER IS REQUIRED.**





WIRING DIAGRAM



SYSTEM CONTROL TIMING CHARTS

Mode SW : LD-SW

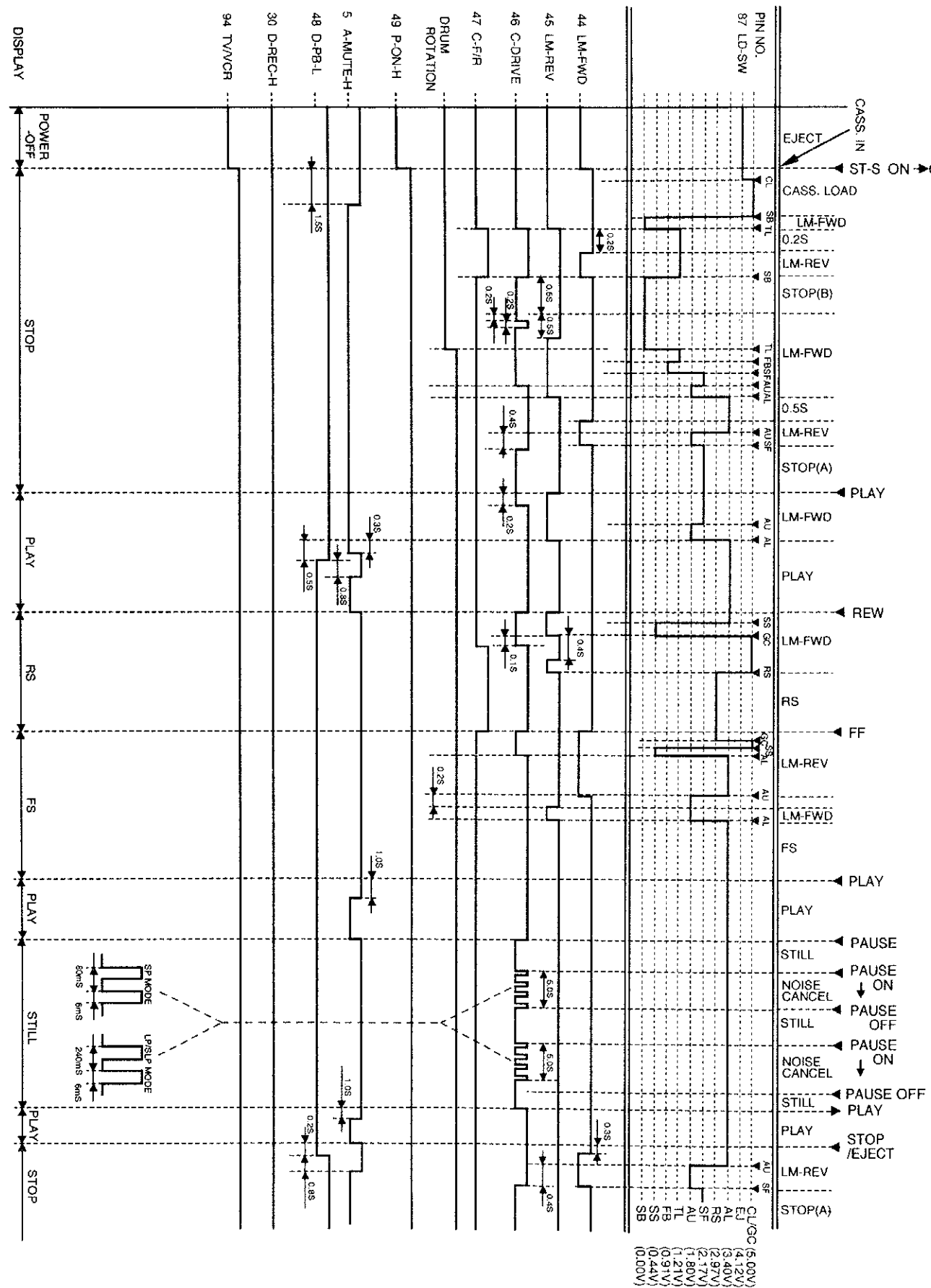
LD-SW Position detection A/D Input voltage Limit (Calculated voltage)	Symbol
3.76V~4.50V (4.12V)	EJ
4.51V~5.00V (5.00V)	CL
0.00V~0.25V (0.00V)	SB
1.06V~1.50V (1.21V)	TL
0.66V~1.05V (0.91V)	FB
1.99V~2.60V (2.17V)	SF
1.51V~1.98V (1.80V)	AU
3.20V~3.75V (3.40V)	AL
0.26V~0.65V (0.44V)	SS
4.51V~5.00V (5.00V)	GC
2.61V~3.19V (2.97V)	RS

↑ Note:

EJ → RS : Loading FWD (LM-FWD "H", LM-REV "L")
RS → EJ : Loading REV (LM-FWD "L", LM-REV "H")
Stop (A) = Loading
Stop (B) = Unloading

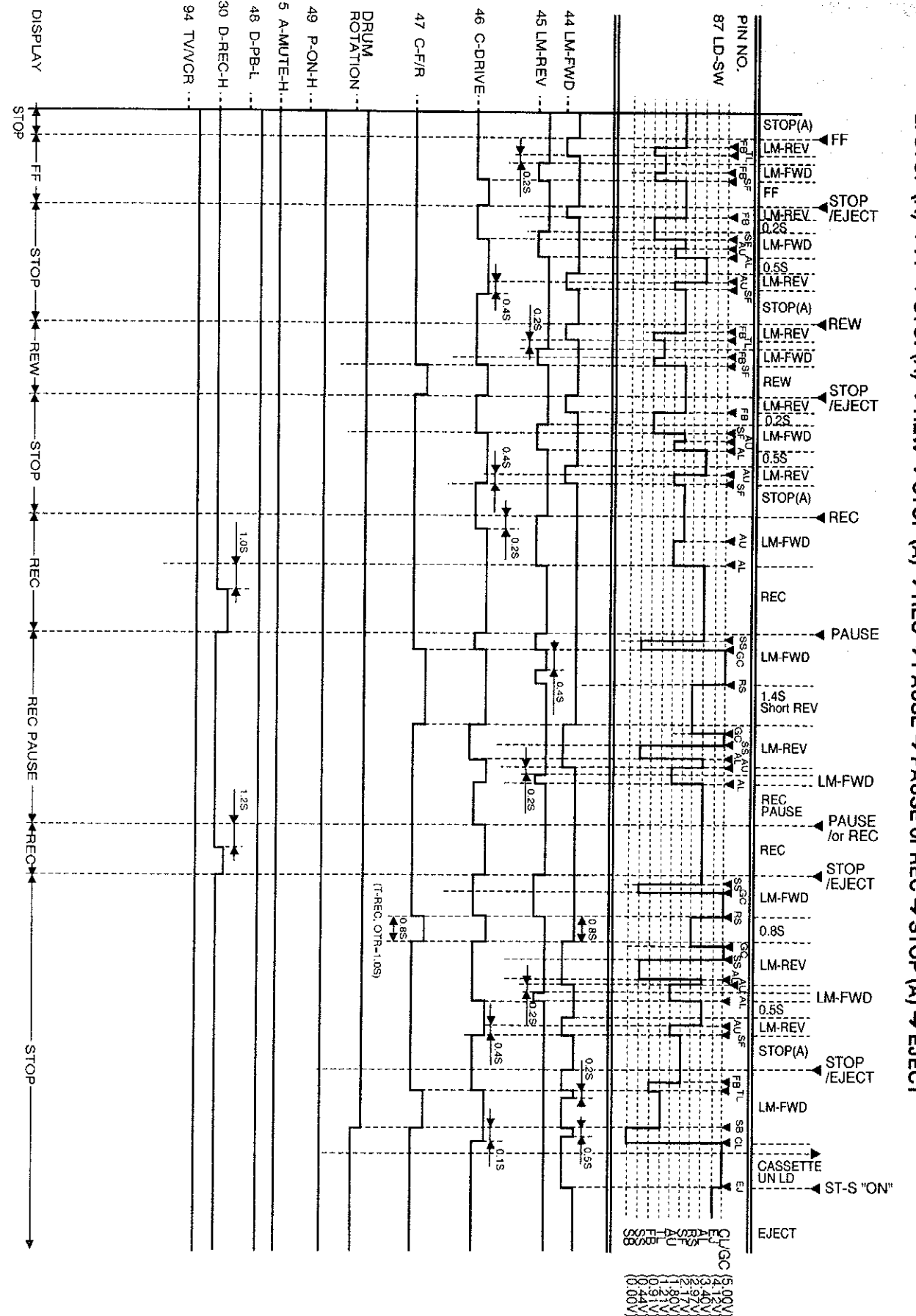
Note :

Symbol	Loading Status
EJ	Eject
CL	Eject ~ REW Reel
SB	REW Reel ~ Stop(B)
TL	Stop(B) ~ Brake Cancel
FB	Brake Cancel ~ FF / REW
SF	FF / REW ~ Stop(A)
AU	Stop(A) ~ Play / REC
AL	Play / REC ~ Still / Slow
SS	Still / Slow ~ Capstan Reversal
GC	Capstan Reversal ~ RS (REW Search)
RS	RS (REW Search)

Models: VT-MX231A/MX231AC/MX231AW

Models: VT-MX231A/MX231AC/MX231AW

2. STOP (A) → FF → STOP(A) → REW → STOP (A) → REC → PAUSE → PAUSE or REC → STOP (A) → EJECT



Models: VT-MX431A/MX431AC

Still/Slow Control

Frame Advance Timing Chart

1) SP Mode

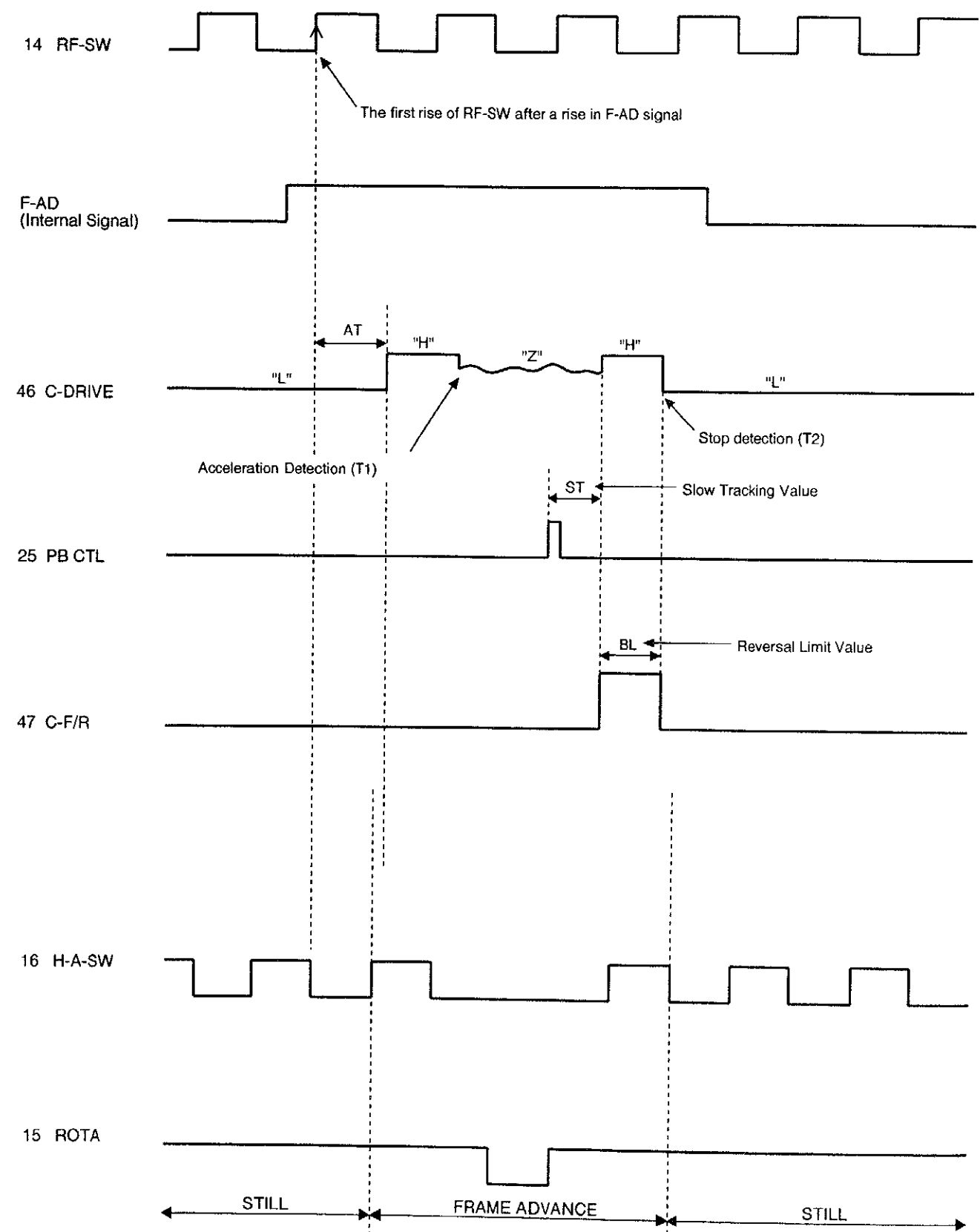


Fig.1

1-11-4

Models: VT-MX431A/MX431AC

2) LP/SLP Mode

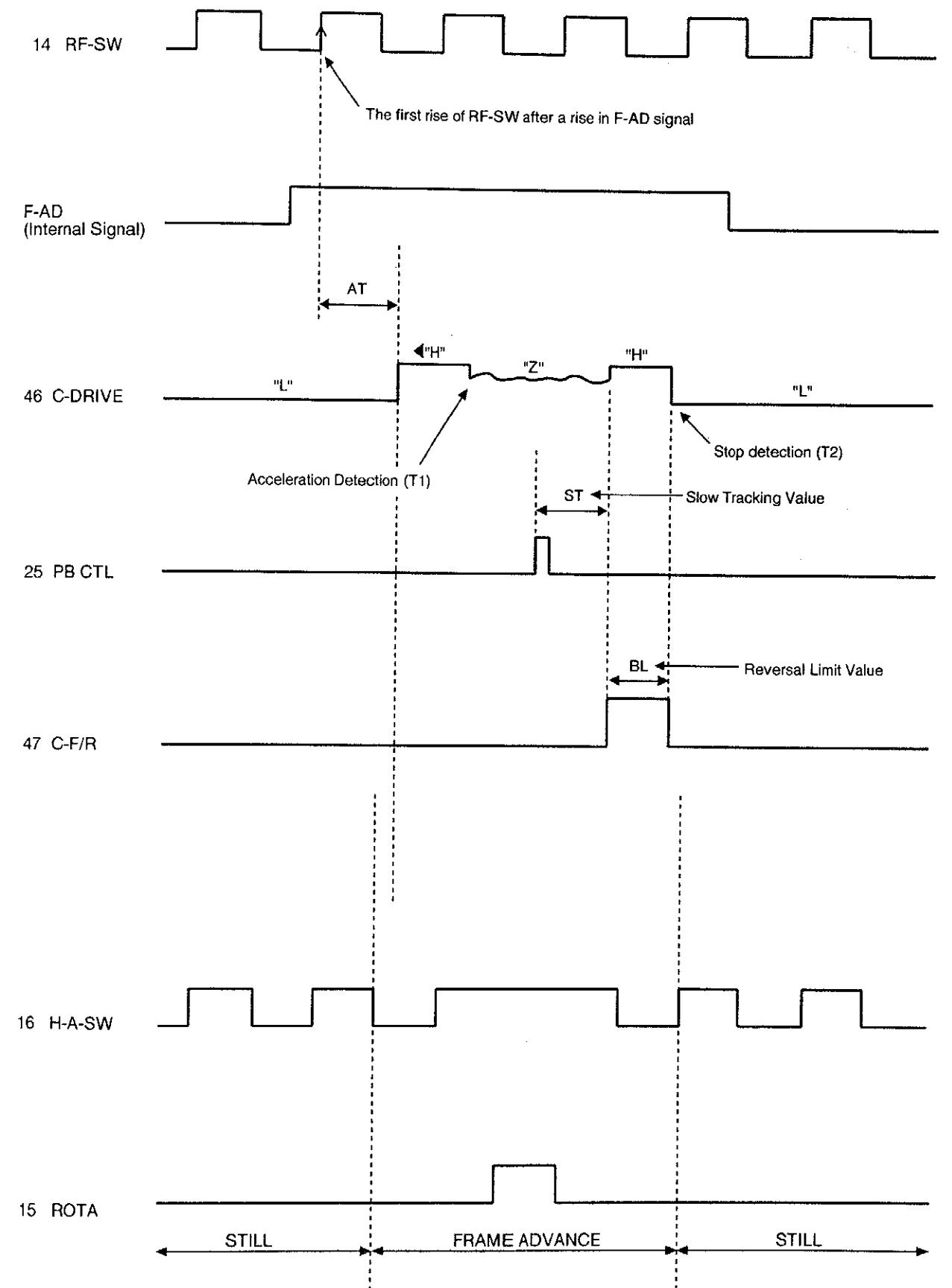


Fig.2

1-11-5

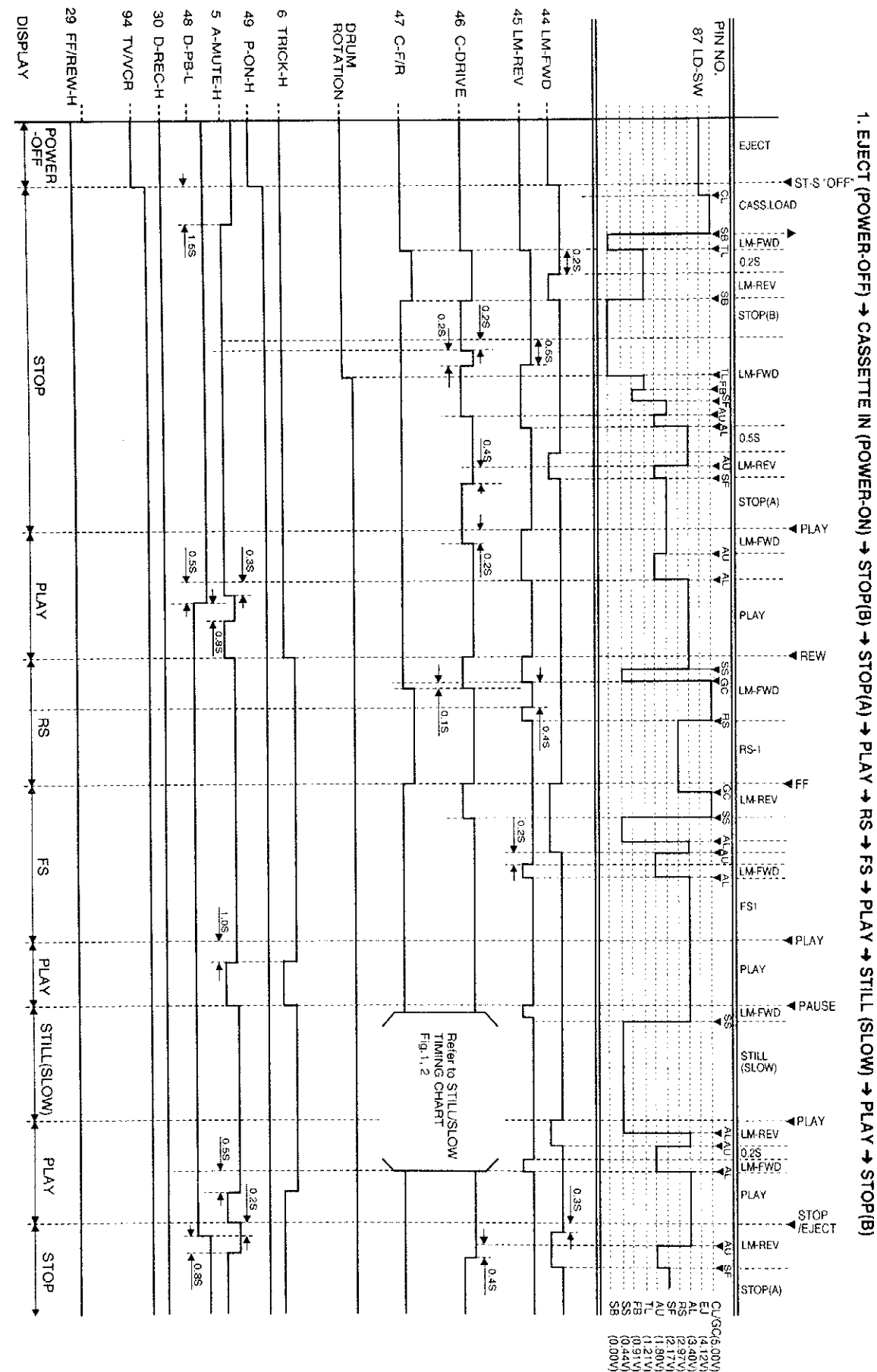


Fig.3

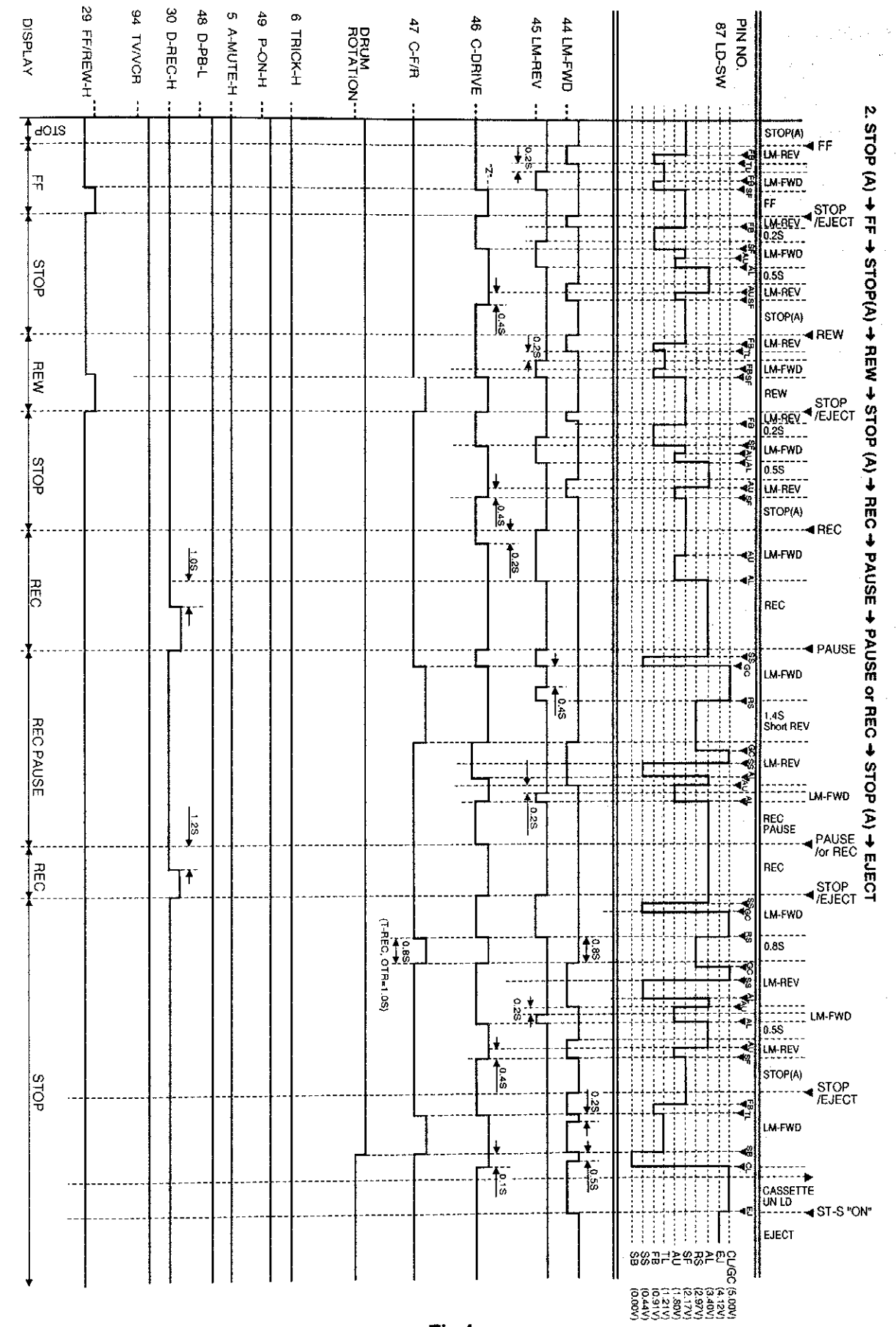


Fig.4

IC PIN FUNCTION DESCRIPTIONS

Comparison Chart of Models and Marks

MODEL	MARK
VT-MX231A	A
VT-MX231AC	B
VT-MX231AW	C
VT-MX431A	D
VT-MX431AC	E

IC501 (SERVO / SYSTEM CONTROL IC)

"H" ≥ 4.5V, "L" ≤ 1.0V

Pin No.	Mark	IN/OUT	Signal Name	Function	Active Level
1		OUT	SP/LP/SLP	Tape Speed SP="L", LP="Hi-Z", SLP="H" Signal	H/Hi-Z/L
2		-	N.U.	Not Used	-
3		OUT	C-CONT	Capstan Motor Control Signal	PWM
4		OUT	D-CONT	Drum Motor Control Signal	PWM
5		OUT	A-MUTE-H	Audio Mute Signal (Mute="H")	H
6	A,B,C	-	N.U.	Not Used	-
	D,E	OUT	TRICK-H	Special Play Back Signal (Special P.B.="H")	H
7		--	N.U.	Not used	--
8		OUT	D-PB-H	Delayed Play Back Control Signal	H
9		OUT	OSD-BLUE-L	Blue Back Control Signal	L
10		OUT	D-V SYNC	Dummy Video Synchronoze	H/Hi-Z
11		IN	REMOC-ON	Remote Control Signal	L
12		-	N.U.	Not Used	-
13		--	N.U.	Not used	--
14		OUT	RF-SW	Video Head Switching Pulse	H/L

Pin No.	Mark	IN/OUT	Signal Name	Function	Active Level
15		OUT	ROTA	Color Phase Rotary Changeover Signal	H/L
16	A,B,C	OUT	ENV-SW	Video DC Envelope Voltage Gain Switching Signal	H/L
	D,E	OUT	H-A-SW	Video Head amp Switching Pulse	H/L
17	A,B,C	-	N.U.	Not Used	-
	D,E	IN	H-A-COMP	Head Amp Comparator	H/L
18		IN	T-REEL	Take Up Reel Rotation Signal	PULSE
19		OUT	REC-CTL(-)	Record Control Signal(-)	H/L
20		OUT	REC-CTL(+)	Record Control Signal(+)	H/L
21	A,B,C	-	N.U.	Not Used	-
	D,E	OUT	STILL/SLOW-L	Still/Slow Circuit Change Over "L" (Usually=Open/R-Still/Slow="H")	H/L
22		IN	C-FG	Capstan Motor Rotation Detection Pulse	PULSE
23		IN	D-PG	Drum Pulse Generator	PULSE
24		IN	D-FG	Drum Frequency Generator	PULSE
25		IN	PB-CTL	Play Back Control Signal	PULSE
26		-	Vcc	Vcc(Timer +5v)	-

Pin No.	Mark	IN/OUT	Signal Name	Function	Active Level
27		OUT	SOFT-H	Rental Position Mode Switching Signal (Rental Position="H"/Usually="L")	H
28		OUT	OSD-CS	On Screen Display IC Control Chip Select Signal	L
29	A,B,C	-	N.U.	Not Used	-
	D,E	OUT	FF/REW-H	CTL Amp Gain Switching Signal (FF/REW="H")	H
30		OUT	D-REC-H	Delayed Record Signal	H
31		-	N.U.	Not Used	-
32		-	N.U.	Not Used	-
33		IN	P-DOWN-L	Power Down Detection	L
34		-	N.U.	Not Used	-
35		-	GND	GND	-
36		-	GND	GND	-
37		IN	RESET	System Reset Signal (Usually="H"/Reset="L")	L
38		-	Xin	Main Clock 14.31818 MHz	-
39		-	Xout	Main Clock	-
40		IN	CLKSEL	Clock Select (GND)	L
41		-	Vss	Vss(GND)	-
42		-	XC IN	Sub Clock 32 kHz	-
43		-	XC OUT	Sub Clock 32 kHz	-
44		OUT	LM-FWD	Loading Motor Forward Control	H
45		OUT	LM-REV	Loading Motor Reverse Control	H

Pin No.	Mark	IN/OUT	Signal Name	Function	Active Level
46		OUT	C-DRIVE	Capstan Motor Drive Signal (Rotation="H" or "Open"/Stop="L")	H/Hi-Z
47		OUT	C-F/R	Capstan Motor FWD/REV Control Signal (FWD="L"/REV="H")	H/L
48		OUT	D-PB-L	Delayed Play Back Control Signal (PB="L")	L
49		OUT	P-ON-H	Power-On="H" Control Signal	H
50		-	N.U.	Not Used	-
51		-	N.U.	Not Used	-
52		-	N.U.	Not Used	-
53		-	N.U.	Not Used	-
54		-	N.U.	Not Used	-
55		-	N.U.	Not Used	-
56		-	N.U.	Not Used	-
57		-	N.U.	Not Used	-
58		-	N.U.	Not Used	-
59		-	N.U.	Not Used	-
60		-	N.U.	Not Used	-
61		OUT	G1	Display Digit	H
62		OUT	G2	Display Digit	H
63		OUT	G3	Display Digit	H
64		OUT	G4	Display Digit	H
65		OUT	a	Display Segment	H
66		OUT	b	Display Segment	H
67		OUT	c	Display Segment	H
68		OUT	d	Display Segment	H
69		OUT	f	Display Segment	H
70		OUT	g	Display Segment	H
71		OUT	h	Display Segment	H

Pin No.	Mark	IN/OUT	Signal Name	Function	Active Level
72		OUT	i	Display Segment	H
73		OUT	j	Display Segment	H
74		OUT	e	Display Segment	H
75		-	VEE	-28V	-
76		-	Vcc	Vcc (Timer+5V)	-
77		OUT	PLL/OSD-DATA	Tuner Control Signal (Data)/ On-Screen IC Control(Data)	H/L
78		-	N.U.	Not Used(GND)	-
79		OUT	PLL/OSD-CLK	Tuner Control Signal/On-Screen IC Control (Clock)	H/L
80		OUT	PLL-ENA	Tuner Control Signal (Enable)	H
81		-	Vcc	Vcc (Timer +5V)	-
82		-	VREF	A/D Converter Reference Voltage Signal (+5V)	-
83		-	N.U.	Not Used	-
84		-	N.U.	Not Used(GND)	-
85		IN	KEY IN-1	A/D Key Data Signal	A/D
86		IN	KEY IN-2	A/D Key Data Signal	A/D
87		IN	LD-SW	Loading SW A/D	A/D
88		IN	AFC	Tuner AFC Voltage Signal	A/D
89		IN	PG-DELAY / TEST	RF-SW Signal Delay Adjust Voltage	A/D

Pin No.	Mark	IN/OUT	Signal Name	Function	Active Level
90		IN	V-ENV / REC-SW	Video DC Envelope Voltage /Recording Safety SW Detect (With Record tab="L"/With out Record tab="H")	A/D
91		IN	END-S	Tape End Position Detect	A/D
92		IN	ST-S	Tape Start Position Detect	A/D
93		IN	C-SYNC	Composite Sync Signal	PULSE
94		OUT	TV/VCR	RF Conv. ON/OFF Signal (TV="L", VCR="H")	H/L
95		-	N.U.	Not Used	-
96		-	N.U.	Not Used	-
97		-	N.U.	Not Used	-
98		OUT	V-MUTE -L	Video Mute Signal (Mute="L")	L
99		OUT	INSEL-2	Input Selector Control Signal 2	H/L
100		OUT	INSEL-1	Input Selector Control Signal 1	H/L

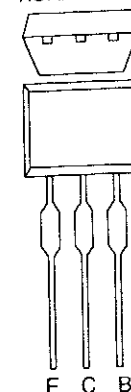
Notes:

Abbreviation for Active Level:

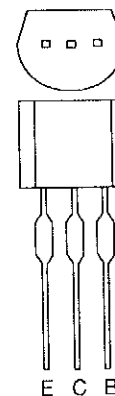
PWM ————— Pulse Wide Modulation
A/D ————— Analog - Digital Converter

LEAD IDENTIFICATIONS

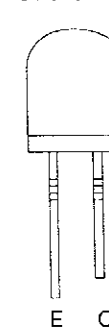
KSA1175 (Y, G)
KSR2203



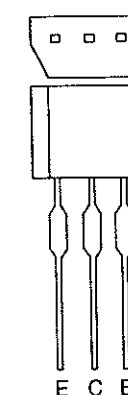
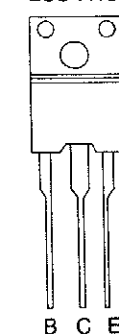
2SC3331 (T, U)
2SC2120(Y)



PT380FAB
ST-319R2-B

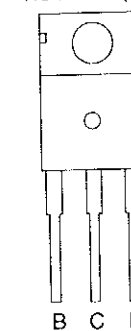


2SC4418

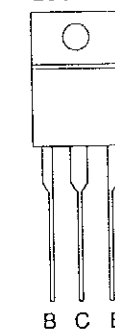


2SC3400
2SA950(Y)
KTA1271(Y)
2SA1317 (S, T)
2SA1346
2SA608SP (E, F)
2SC2839 (E, F)
2SC536SP (E, F, G)
KRA103M
KRC103M
KSC2785(Y, G, L)
KSR1203
KTA1266 (Y, GR)
KTA1267 (Y, GR)
KTC3193 (Y)
KTC3199 (Y, GR, BL)

KSC5020 (O, R)



2SC4953



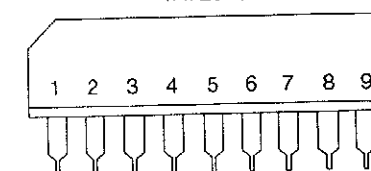
KA431Z
KIA431



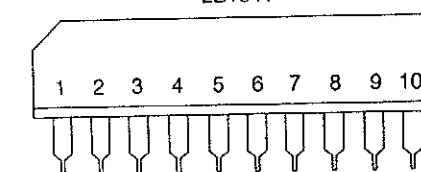
PC-17T1
PC817 (B, AB, A)
TLP521-1 (GR)



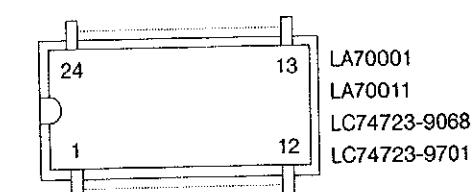
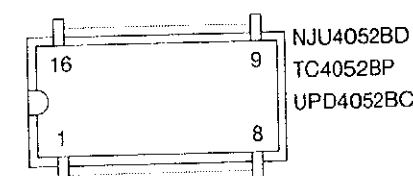
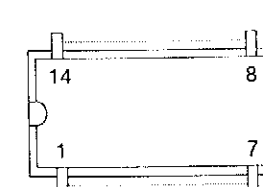
TA7291S



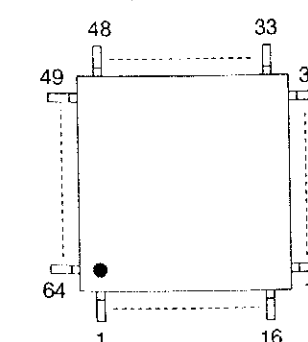
LB1641



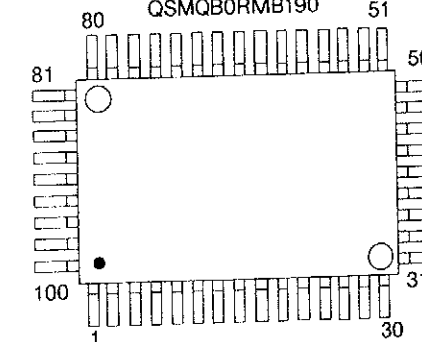
LM324N
NJM324D



LA71021M



QSMQC0RMB167
QSMQB0RMB168
QSMQB0RMB190



Note:

A: Anode
K: Cathode
E: Emitter
C: Collector
B: Base
R: Reference

DECK MECHANISM SECTION

VIDEO CASSETTE RECORDER

VT-MX231A / VT-MX231AC / VT-MX231AW
VT-MX431A / VT-MX431AC

DECK MECHANISM SECTION

- Standard Maintenance
- Mechanical Alignment Procedures
- Disassembly/Assembly of Mechanism
- Alignment for Mechanism

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Mechanical Alignment Procedures	2-3-1
Disassembly / Assembly Procedures of Deck Mechanism.....	2-4-1
Front Loading Assembly	2-4-8
Alignment Procedures of Mechanism	2-4-10

STANDARD MAINTENANCE

Service Schedule of Components

H: Hours ○: Check ●: Change

Deck		Periodic Service Schedule			
Ref. No.	Part Name	1,000 H	2,000 H	3,000 H	4,000 H
B2	Cylinder Assembly	○	●	○	●
B3	Loading Motor Assembly			●	
B8	Pulley Assembly		●		●
B21	Loading Belt		●		●
B27	Tension Lever Assembly		●		●
B31	AC Head Assembly			●	
B32, B339	Reel Base Assembly			●	
B37	Capstan Motor		●		●
B52	Capstan Belt		●		●
*B73	FE Head CBA			●	
B132	Clutch Assembly		●		●
B133	Idler Assembly		●		●
B410	Pinch Roller Assembly		●		●
B413	Main Brake T Assembly		●		●
B414	Main Brake S Assembly		●		●

Notes:

1. Clean all parts for the tape transport (Upper Drum with Video Head / Pinch Roller / Audio Control Head / Full Erase Head) using 90% Isopropyl Alcohol.
 2. After cleaning the parts, do all DECK ADJUSTMENTS.
 3. For the reference numbers listed above, refer to Deck Exploded Views.
- * B73 ——— VCR Model only

Cleaning

Cleaning of Video Head

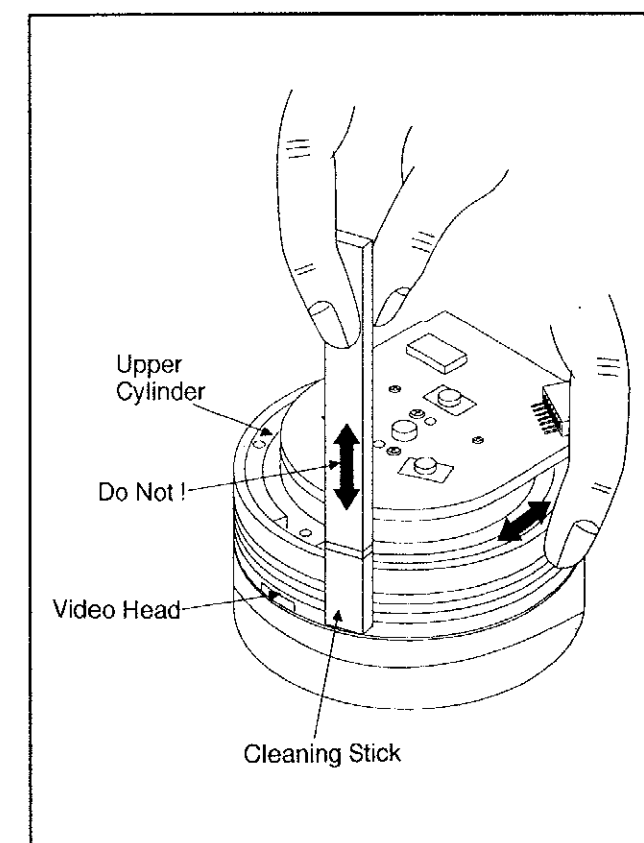
Clean the head with a head cleaning stick or chamois cloth.

Procedure

1. Remove the top cabinet.
2. Put on a glove (thin type) to avoid touching the upper and lower drum with your bare hand.
3. Put a few drops of 90% Isopropyl alcohol on the head cleaning stick or on the chamois cloth and, by slightly pressing it against the head tip, turn the upper drum to the right and to the left.

Notes:

1. The video head surface is made of very hard material, but since it is very thin, avoid cleaning it vertically.
2. Wait for the cleaned part to dry thoroughly before operating the unit.
3. Do not reuse a stained head cleaning stick or a stained chamois cloth.



Cleaning of Audio Control Head

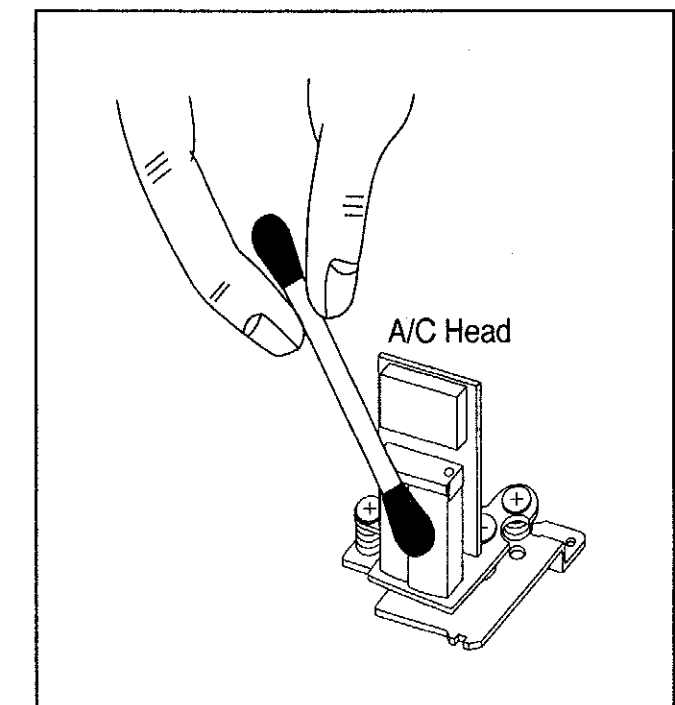
Clean the head with a cotton swab.

Procedure

1. Remove the top cabinet.
2. Dip the cotton swab in 90% isopropyl alcohol and clean the audio control head. Be careful not to damage the upper drum and other tape running parts.

Notes:

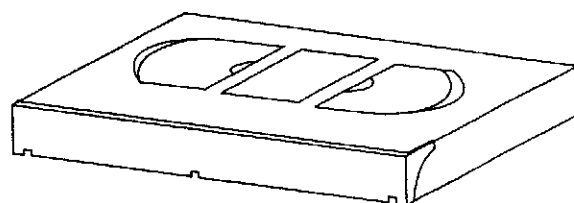
1. Avoid cleaning the audio control head vertically.
2. Wait for the cleaned part to dry thoroughly before operating the unit or damage may occur.



FIXTURE AND TAPE FOR ADJUSTMENT

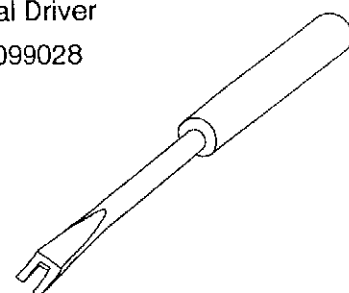
1. Alignment Tape

No. 7099046 (MH-1)
No. 7099089 (30HMP2-1)



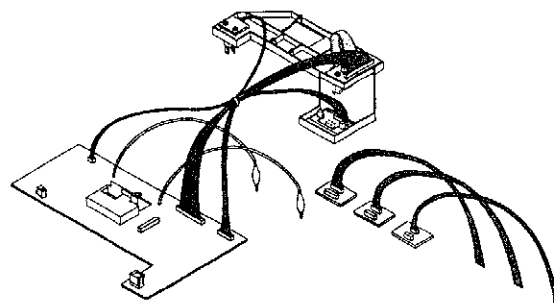
2. Special Driver

No. 7099028



3. U17 Deck Extension Cable

No. 7069201



How To Use The Fixtures And Tape

Item No.	Name	Part No.	How to used
1	Alignment Tape	7099046 7099089	● Head Switching Point ● Tape Interchangeability Alignment
2	Special Driver	7099028	● Guide Roller
3	U17 Deck Extension Cable	7069201	● All Mechanical and Electrical Adjustments

MECHANICAL ALIGNMENT PROCEDURES

Explanation of alignment for the tape to correctly run starts on the next page. Refer to the information below on this page if a tape gets stuck, for example, in the mechanism due to some electrical trouble of the unit.

Service Information

A. Method for Manual Tape Loading/Unloading

To load a cassette tape manually:

1. Disconnect the AC plug.
2. Remove the Top Cover.
3. Insert a cassette tape. Though the tape will not be automatically loaded, make sure that the cassette tape is all the way in at the inlet of the Cassette Holder. To confirm this, lightly push the cassette tape further in and see if the tape comes back out, by a spring motion, just as much as you have pushed in.
4. Turn the Pulley Assembly in the appropriate direction shown in Fig. M1 until the cassette tape is fully loaded. By turning the Pulley Assembly, you are turning the cam indicated in this figure. However, movement of the cam will be very slow. Allow a minute or two to complete this task.

To unload a cassette tape manually:

1. Disconnect the AC plug.
2. Remove the Top Cover.
3. Turn the Pulley Assembly in the appropriate direction shown in Fig. M1 to unload the cassette tape. When turning the Pulley Assembly, please be aware that this is a long process and the cassette will not start getting unloaded instantaneously. Within this long process, before the cassette actually starts getting unloaded, there is a time period during which the moving guide assemblies slide back to their original positions shown in Fig. M1. However, the tape will be left wound around the cylinder. To put the tape back into the cassette, gently turn the Capstan Motor in the direction shown in Fig. M2. Make sure that the tape is completely placed back in the cassette before the cassette starts getting unloaded. Otherwise the tape hanging out will be caught and damaged by the lid of the cassette when it closes. By turning the Pulley Assembly, you are turning the cam indicated in Fig. M1. As stated, movement of the cam will be very slow. Allow a minute or two to complete this task.

B. Method to place the Cassette Holder in the tape-loaded position without a cassette tape

1. Disconnect the AC Plug.

2. Remove the Top Cover.

3. Turn the Pulley Assembly in the appropriate direction shown in Fig. M1. Release the locking tabs shown in Fig. M1 and continue turning the Pulley Assembly until the Cassette Holder comes to the tape-loaded position. Allow a minute or two to complete this task.

Top View

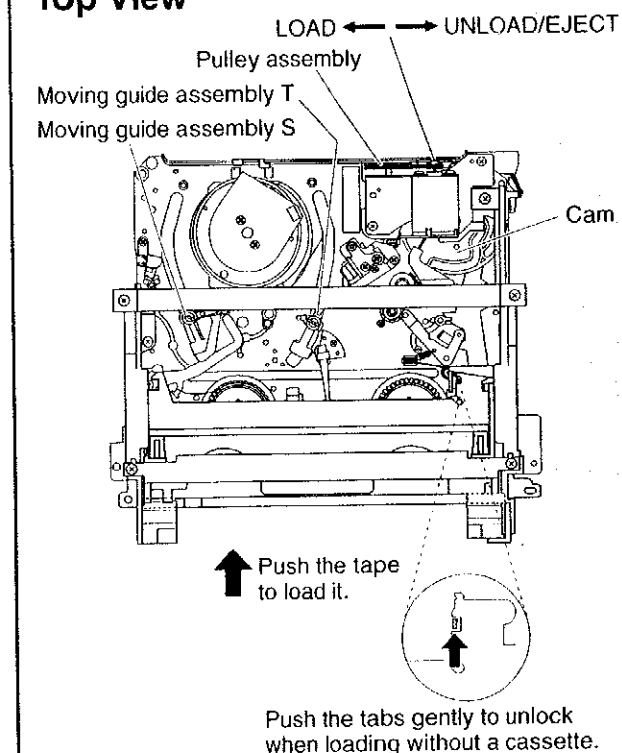


Fig. M1

Bottom View

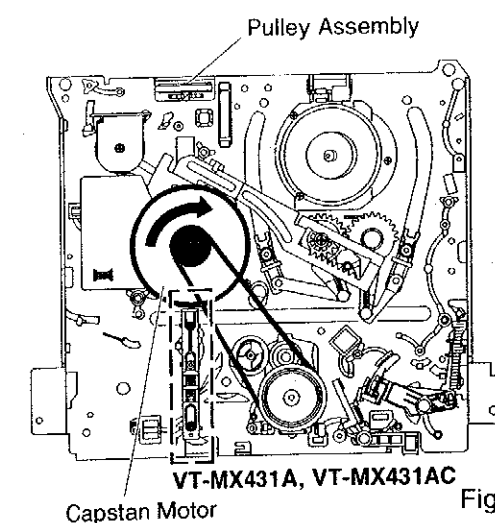


Fig. M2

1. Tape Interchangeability Alignment

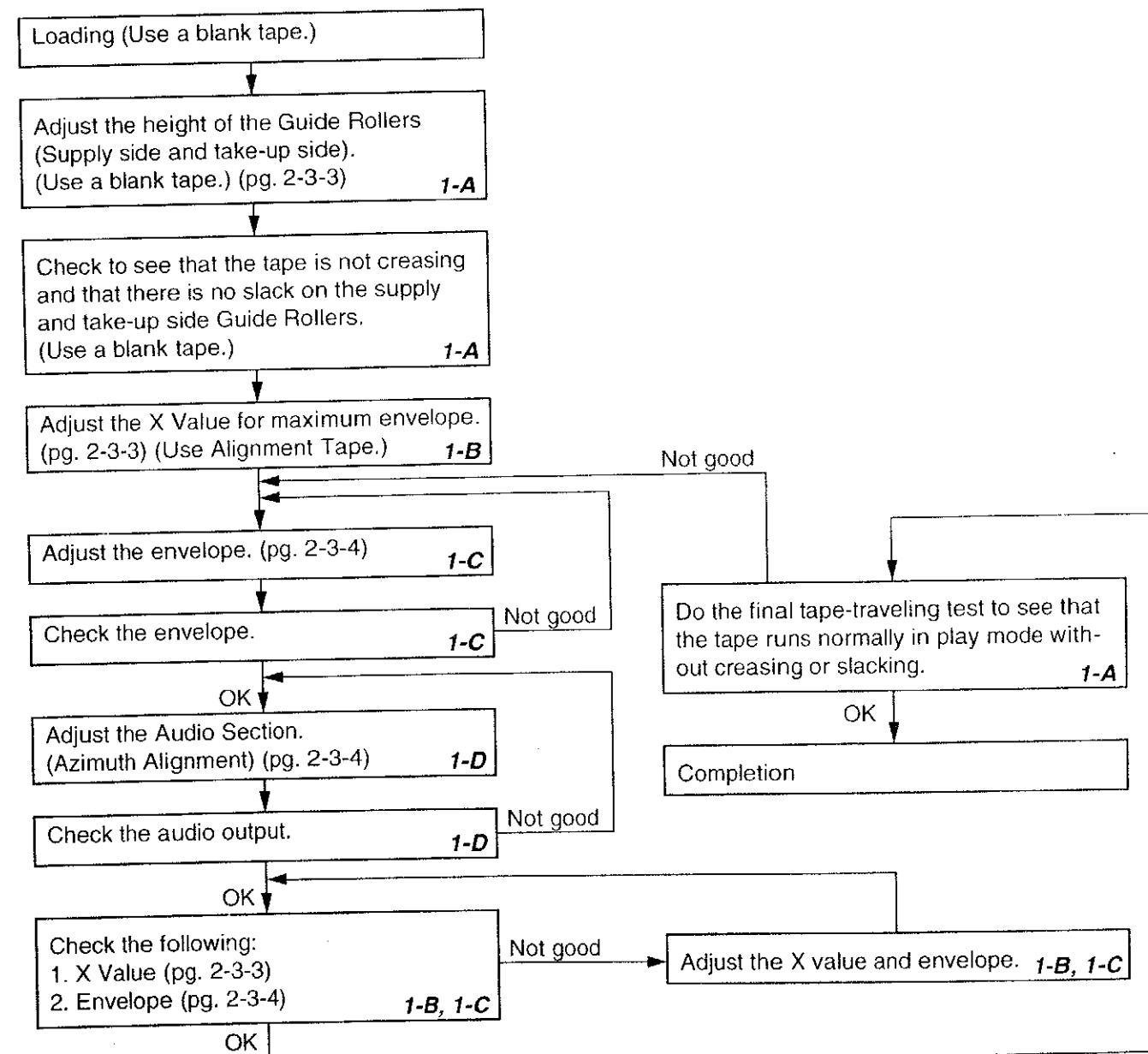
Note: To do these alignment procedures, make sure that the Tracking Control Circuit is set to the center position every time a tape is loaded or unloaded. (Refer to page 2-3-4, procedure 1-C, step 2.)

Equipment required:

Dual Trace Oscilloscope
VHS Alignment Tape (30HMP2-1 or MH-1)
Guide Roller Adj. Screwdriver
X-Value Adj. Screwdriver

Note: Before starting this Mechanical Alignment, do all Electrical Adjustment procedures.

Flowchart of Alignment for tape traveling



1-A. Preliminary/Final Checking and Alignment of Tape Path

Purpose:

To make sure that the tape path is well stabilized.

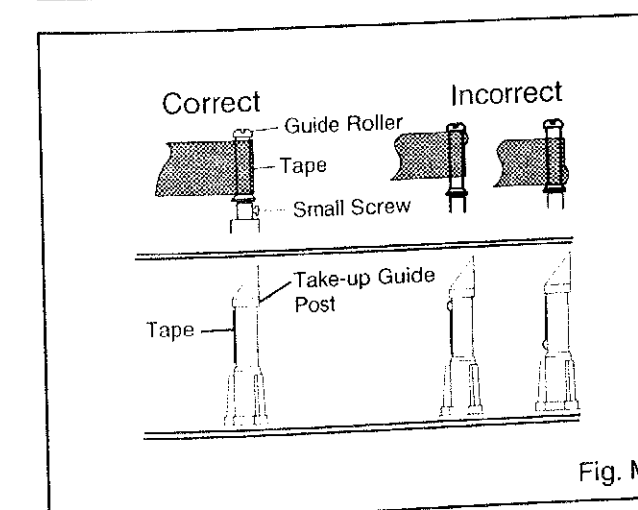
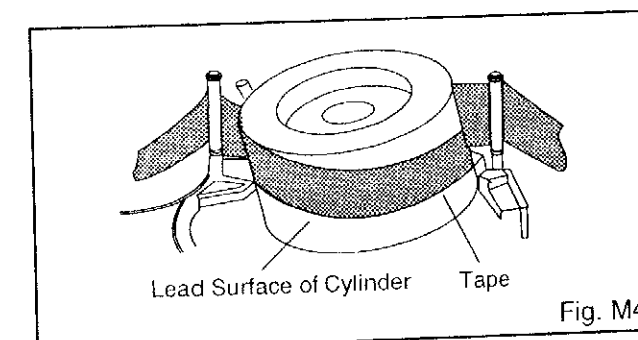
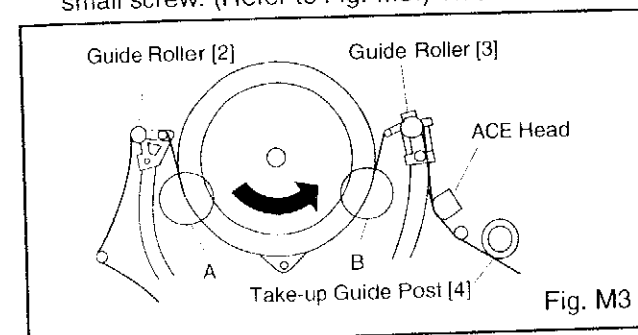
Symptom of Misalignment:

If the tape path is unstable, the tape will be damaged.

Note: Do not use an Alignment Tape for this procedure. If the unit is not correctly aligned, the tape may be damaged.

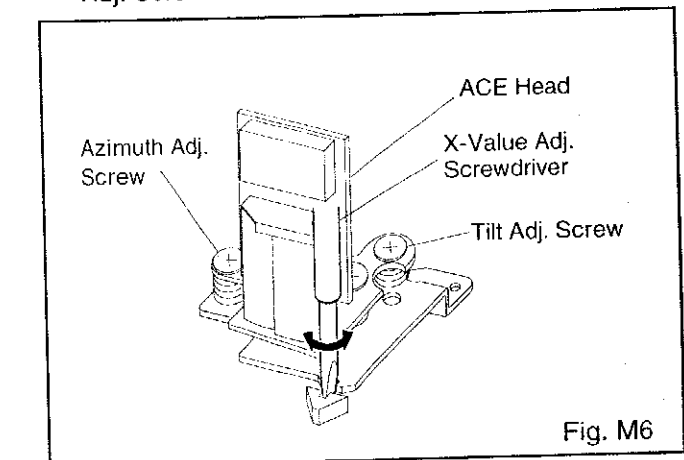
1. Play back a blank cassette tape and check to see that the tape runs without creasing at Guide Rollers [2] and [3], and at points A and B on the lead surface. (Refer to Fig M3 and M4.)
2. If creasing is apparent, align the height of the guide rollers by turning the top of Guide Rollers [2] and [3] with a Guide Roller Adj. Screwdriver. (Refer to Fig. M3 and M5.)

Note: Beneath each Guide Roller, there is a small screw. (Refer to Fig. M5.) This screw works



to apply adequate torque to the shaft of each Guide Roller so that the Guide Roller turns properly. Even when adjusting the height of the Guide Roller(s), do not touch these two small screws.

3. Check to see that the tape runs without creasing at Take-up Guide Post [4] or without snaking between Guide Roller [3] and ACE Head. (Fig. M3 and M5)
4. If creasing or snaking is apparent, adjust the Tilt Adj. Screw of the ACE Head. (Fig. M6)



1-B. X Value Alignment

Purpose:

To align the Horizontal Position of the Audio/Control/Erase Head.

Symptom of Misalignment:

If the Horizontal Position of the Audio/Control/Erase Head is not properly aligned, maximum envelope cannot be obtained at the Neutral position of the Tracking Control Circuit.

1. Connect the oscilloscope to TP301 (C-PB) and TP505 (CTL) on the Main CBA. Use TP504 (RF-SW) as a trigger.
2. Play back the Gray Scale of the Alignment Tape (30HMP2-1 or MH-1) and confirm that the PB FM signal is present.
3. Set the Tracking Control Circuit to the center position by pressing the tracking UP button on the remote control then the PLAY button on the VCP. (Refer to note on bottom of page 2-3-4.)
4. Use the X-Value Adj. Screwdriver so that the PB FM signal at TP301 (C-PB) is maximum. (Fig. M6)
5. Press the tracking UP button on the remote until the CTL waveform has shifted by approx. +2msec. Make sure that the envelope is simply attenuated (shrinks in height) during this process so that you will know the envelope has been at its peak.

- Press the tracking DOWN button on the remote until the CTL waveform has shifted from its original position (not the position achieved in step 5, but the position of CTL waveform in step 4) by approximately -2msec. Make sure that the envelope is simply attenuated (shrinks in height) once CTL waveform passes its original position and is further brought in the minus direction.
- Set the Tracking Control Circuit to the center position by pressing the tracking UP button on the remote then press the PLAY button on the VCP.

1-C. Checking/Adjustment of Envelope Waveform

Purpose:

To achieve a satisfactory picture and precise tracking.

Symptom of Misalignment:

If the envelope output is poor, noise will appear in the picture. The tracking will then lose precision and the playback picture will be distorted by any slight variation of the Tracking Control Circuit.

- Connect the oscilloscope to TP301 (C-PB) on the Main CBA. Use TP504 (RF-SW) as a trigger.
- Play back the Gray Scale on the Alignment Tape (30HMP2-1 or MH-1). Set the Tracking Control Circuit to the center position by pressing the tracking UP button on the remote then press the PLAY button on the VCP. Adjust the height of Guide Rollers [2] and [3] (Fig. M3, Page 2-3-3) watching the oscilloscope display so that the envelope becomes as flat as possible. To do this adjustment, turn the top of the Guide Roller with the Guide Roller Adj. Screwdriver.
- If the envelope is as shown in Fig. M7, adjust the height of Guide Roller [2] (Refer to Fig. M3) so that the waveform looks like the one shown in Fig. M9.
- If the envelope is as shown in Fig. M8, adjust the height of Guide Roller [3] (Refer to Fig. M3) so that the waveform looks like the one shown in Fig. M9.
- When Guide Rollers [2] and [3] (Refer to Fig. M3) are aligned properly, there is no envelope drop either at the beginning or end of track as shown in Fig. M9.

Note: Upon completion of the adjustment of Guide Rollers [2] and [3] (Refer to Fig. M3), check the X Value by pushing the tracking UP or DOWN buttons on the remote alternately, to check the symmetry of the envelope. Check the number of pushes to ensure center position. The number of pushes UP to achieve 1/2 level of envelope should match the number of pushes DOWN from center. If required, redo the "X Value Alignment."

1-D. Azimuth Alignment of Audio/Control/Erase Head

Purpose:

To correct the Azimuth alignment so that the Audio/Control/Erase Head meets tape tracks properly.

Symptom of Misalignment:

If the position of the Audio/Control/Erase Head is not properly aligned, the Audio S/N Ratio or Frequency Response will be poor.

- Connect the oscilloscope to the audio output jack on the rear side of the deck.
- Play back the alignment tape (30HMP2-1 or MH-1) and confirm that the audio signal output level is 8 kHz.
- Adjust Azimuth Adj. Screw so that the output level on the AC Voltmeter or the waveform on the oscilloscope is at maximum. (Fig. M6)

Dropping envelope level at the beginning of track.



Fig. M7

Dropping envelope level at the end of track.

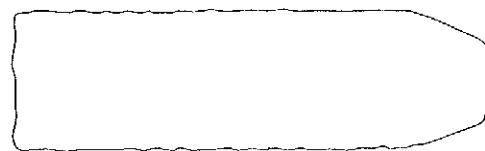


Fig. M8

Envelope is adjusted properly. (No envelope drop)



Fig. M9

DISASSEMBLY/ASSEMBLY PROCEDURES OF DECK MECHANISM

Main Mechanism

Before following the procedures described below, be sure to:

- Remove the deck assembly from the cabinet.
(Refer to CABINET DISASSEMBLY INSTRUCTIONS on page 1-6-1.)
- Remove Front Loading Assembly from the main mechanism of the deck assembly. (See Fig. DM1.)
- First remove Step/Loc. No. [39], and start to remove other parts. (See Fig. DM1.)
- Before Step/Loc. No. [2] and [9] first remove ACH Connector A, ACH Connector B, VH Connector A, and VH Connector B. (See Fig. DM2.)

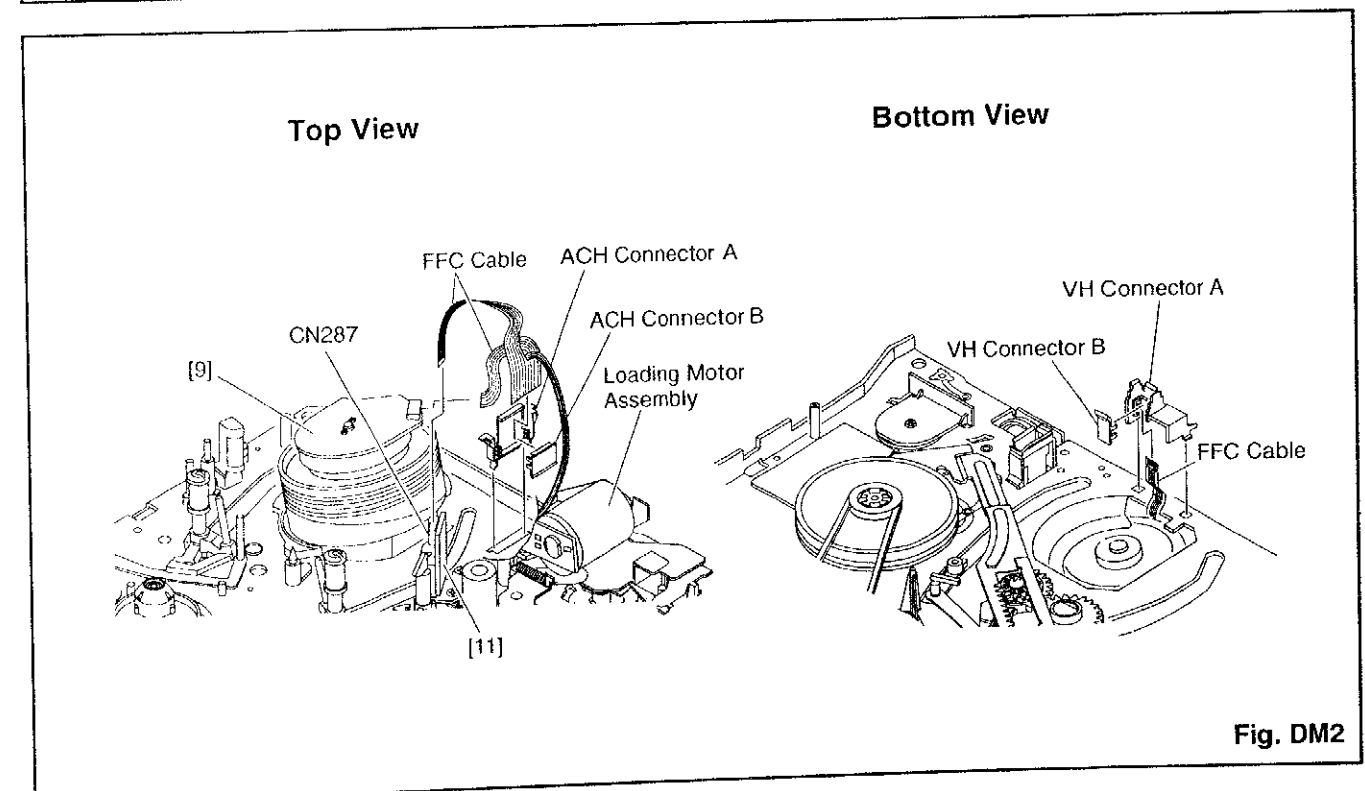
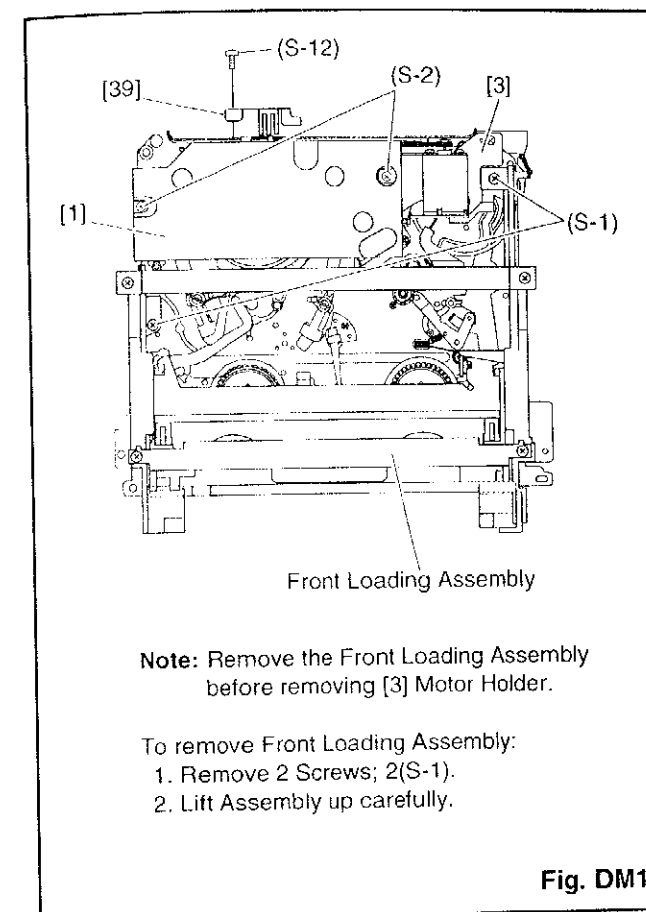
All the following procedures, including those for adjustment and replacement of parts, should be done in Eject mode; see the positions of [37] and [38] in Fig. DM3 on page 2-4-4. When reassembling, follow the steps in reverse order.

STEP /LOC. No.	START-ING No.	PART		REMOVAL		INSTALLATION
				Fig. No.	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	ADJUSTMENT CONDITION
[1]	[1]	Cylinder Shield	T	DM1	2(S-2)	
[2]	[2]	Loading Motor Assembly	T	DM2 DM3 DM5 DM6	2(S-3), Loading Belt ACH Connectors A and B, FFC Cable	
[3]	[2]	Motor Holder	T	DM1 DM3 DM5	2(S-4)	
[4]	[2]	Cassette Drive Lever Sub Assembly	T	DM3 DM5		(+) Refer to Alignment Sec. Pg. 2-4-10
[5]	[2]	Pinch Roller Assembly	T	DM3 DM5	(C-1)	Refer to Alignment Sec. Pg. 2-4-10
[6]	[6]	Mode SW CBA	B	DM4 DM5	(S-5), Desolder	
[7]	[2]	Cam	T	DM3 DM5		(+) Refer to Alignment Sec. Pg. 2-4-10
[8]	[2]	Pulley Assembly	T	DM3 DM6	(W-1), Loading Belt	(+)
[9]	[9]	Cylinder Assembly	T B	DM2 DM3 DM7	3(S-6), *VH Connectors A and B, FFC Cable	
[10]	[10]	FE Head	T	DM3 DM7	(S-7)	
[11]	[11]	ACE Head Assembly	T	DM2 DM3 DM8	2(S-8), FFC Cable	
[12]	[12]	Tape Guide Assembly	T	DM3 DM8	*(P-0), *(L-1)	
[13]	[12]	Capstan Motor	B T	DM4 DM5 DM9 DM16	3(S-9), Capstan Belt, Desolder	
[14]	[14]	Tension Lever Assembly	T	DM3 DM10	*(L-2), *(L-3), *(P-1), *(P-2)	
[15]	[15]	M Brake S Assembly	T	DM3 DM10	*(L-4)	
[16]	[16]	Rec Arm	B	DM4 DM11	*(L-5)	
[17]	[17]	BT Arm	B	DM4 DM10 DM11	*(L-6), *(P-2)	
[18]	[17]	Holder Kick Arm	B	DM4 DM11	*(P-3)	
[19]	[17]	Tension Plate	B	DM4 DM11		

STEP /LOC. No.	START- ING No.	PART		Fig. No.	REMOVAL	INSTALLATION
					REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	ADJUSTMENT CONDITION
[20]	[17]	Motor Lever	T	DM3 DM12	*4(L-7), *(L-8), *Locking Tab	
[21]	[17]	Idler Assembly	T	DM3 DM13	*(L-9)	
[22]	[14]	S Brake Lever Assembly	T	DM3 DM14	*(P-4), *(L-10)	
[23]	[17]	M Brake T Assembly	T	DM3 DM13	*(P-5), *(L-11)	
[24]	[14]	Reel S	T	DM3 DM14	Poly Slider Washer	(+) Base has slots.
[25]	[17]	Reel Base Assembly T	T	DM3 DM14	Poly Slider Washer	(+)
[26]	[26]	M Gear	T	DM3 DM14	(W-2)	
[27]	[2]	Main Lever Assembly	T	DM3 DM15		
[28]	[2]	M Lever Holder	T	DM3 DM15	*2(L-12)	
[29]	[29]	Clutch Assembly	B	DM4 DM16	2(C-2), Capstan Belt, Poly Slider Washer	(+)
[30]	[29]	FF Arm	B	DM4 DM16	*2(L-13)	
[31]	[31]	Sensor Gear	B	DM4 DM17	(C-3)	
[32]	[32]	Spring	T	DM3 DM8		
[33]	[33]	Prism	T	DM3 DM13	(S-10)	
[34]	[12]	Loading Lever Assembly	B	DM4 DM18	(S-11)	(+) Refer to Alignment Sec. Pg. 2-4-10
[35]	[34]	Loading Arm T Assembly	B	DM4 DM18		(+) Refer to Alignment Sec. Pg. 2-4-10
[36]	[34]	Loading Arm S Assembly	B	DM4 DM18	(S-15)	(+) Refer to Alignment Sec. Pg. 2-4-10
[37]	[2]	Moving Guide S Preparation	T	DM3 DM19		
[38]	[2]	Moving Guide T Preparation	T	DM3 DM19		
[39]	[39]	Deck Earth Plate	T	DM1 DM3	(S-12)	
[41]	[41]	Insulation Cover	T	DM3 DM13	*2(L-15)	
[42]	[42]	F Brake Guide [VT-MX431A, VT-MX431AC]	B	DM4 DM9	(S-13), (S-14), *(P-6)	

① ② ③ ④ ⑤ ⑥ ⑦

- ①: Follow steps in sequence. When reassembling, follow the steps in reverse order. These numbers are also used as Identification (location) No. of parts in the figures.
- ②: Indicates the part to start disassembling with in order to disassemble the part in column (1).
- ③: Name of the part
- ④: Location of the part: T=Top B=Bottom R=Right L=Left
- ⑤: Figure Number
- ⑥: Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered. P=Spring, W=Washer, C=Cut Washer, S=Screw, *=Unhook, Unlock, Release, Unplug, or Desolder e.g., 2(L-2) = two Locking Tabs (L-2).
- ⑦: Adjustment Information for Installation
(+): Refer to Deck Exploded Views for lubrication.



Top View

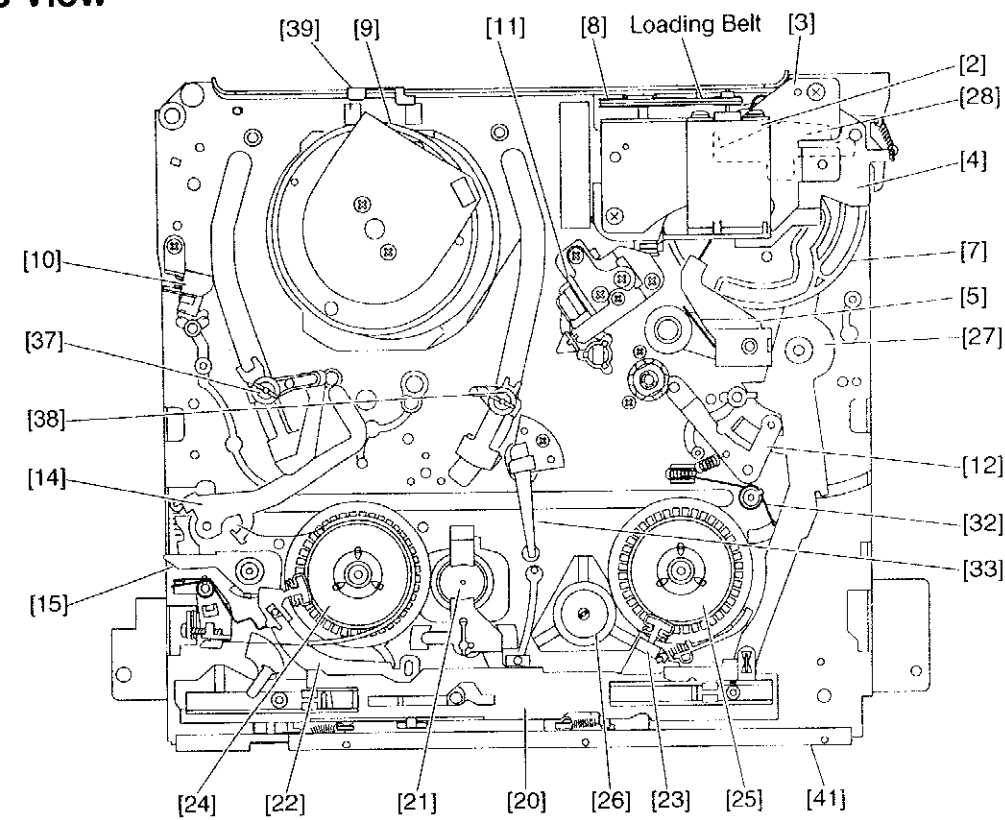


Fig. DM3

Bottom View

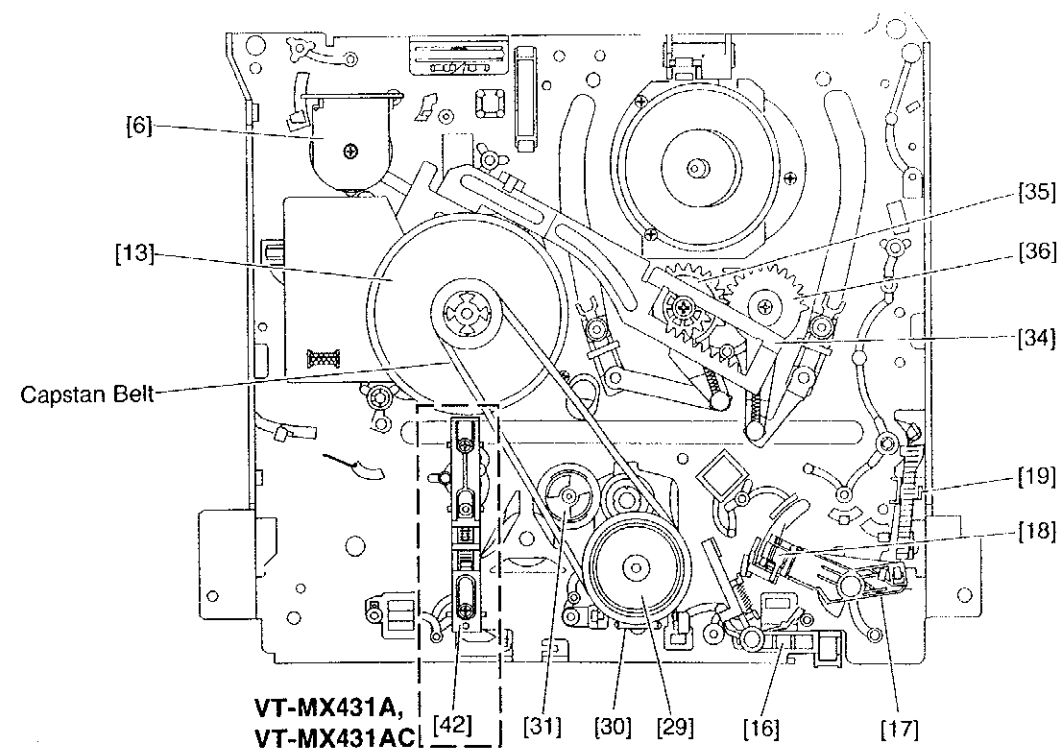


Fig. DM4

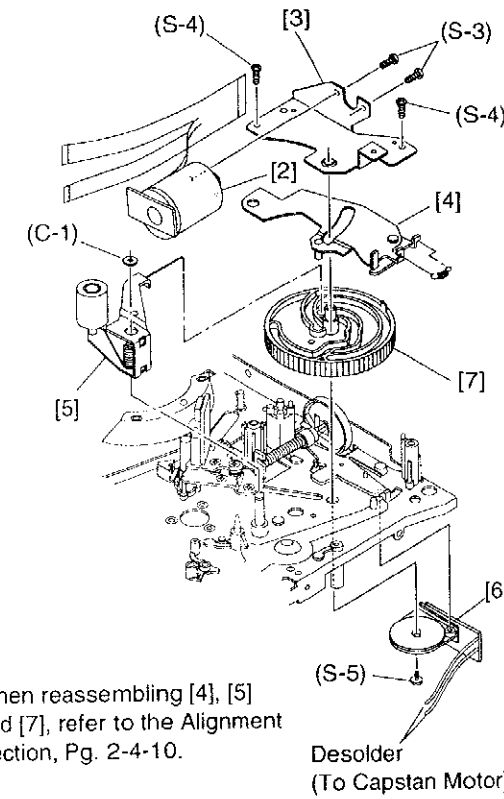


Fig. DM5

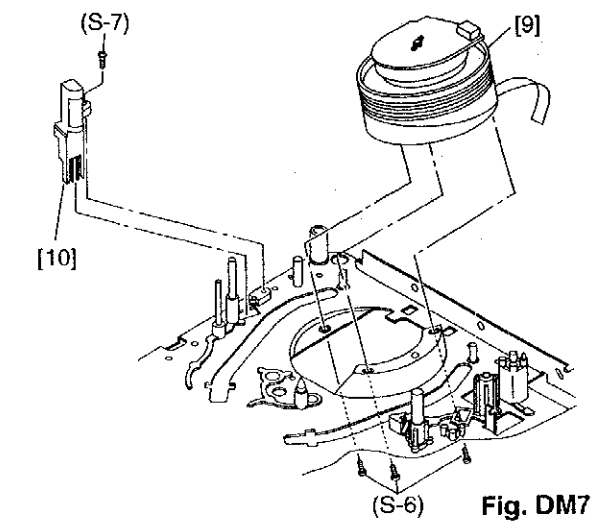


Fig. DM7

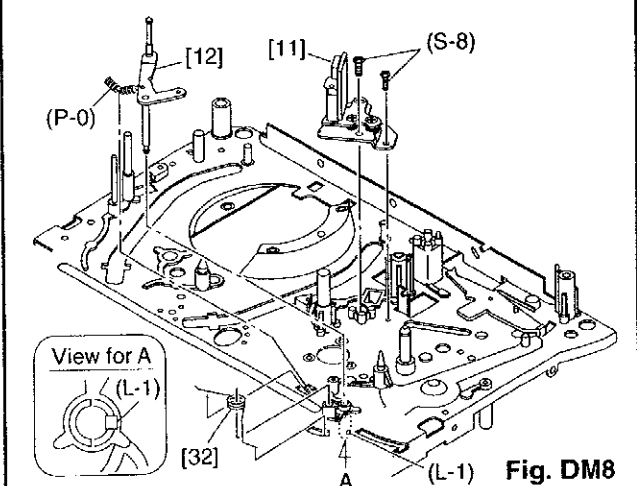
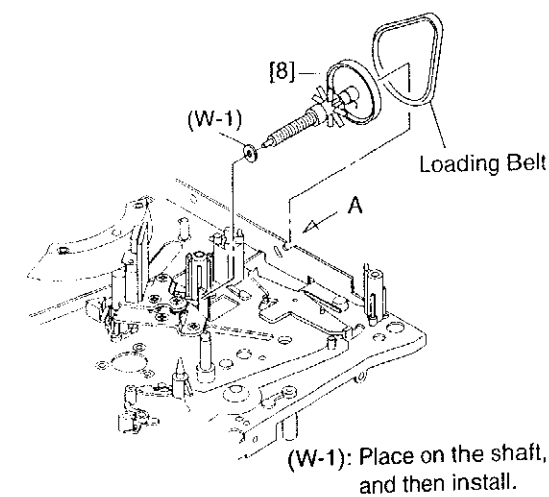


Fig. DM8



View for A

Pull in this direction to remove.

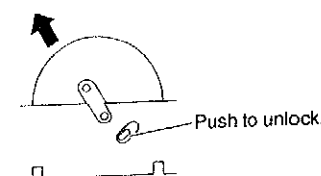


Fig. DM6

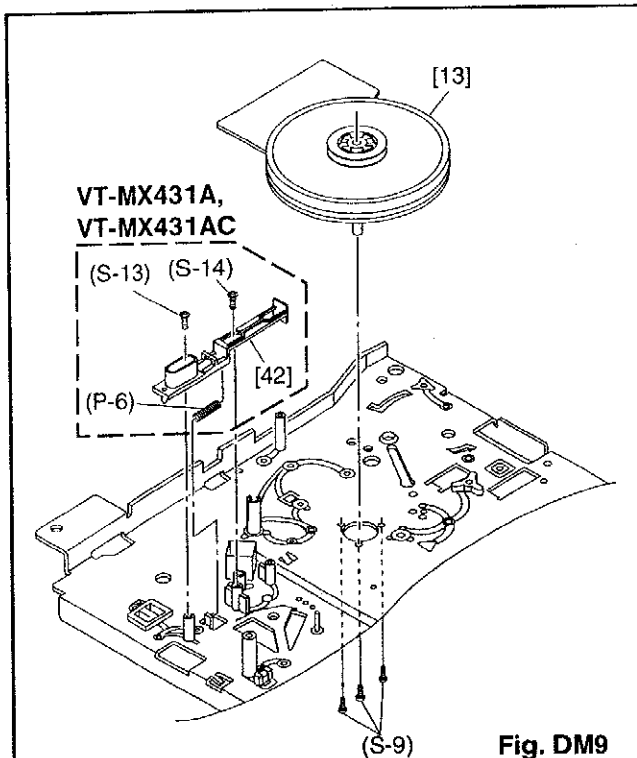


Fig. DM9

When reassembling, refer to the Alignment Section, Pg. 2-4-12.

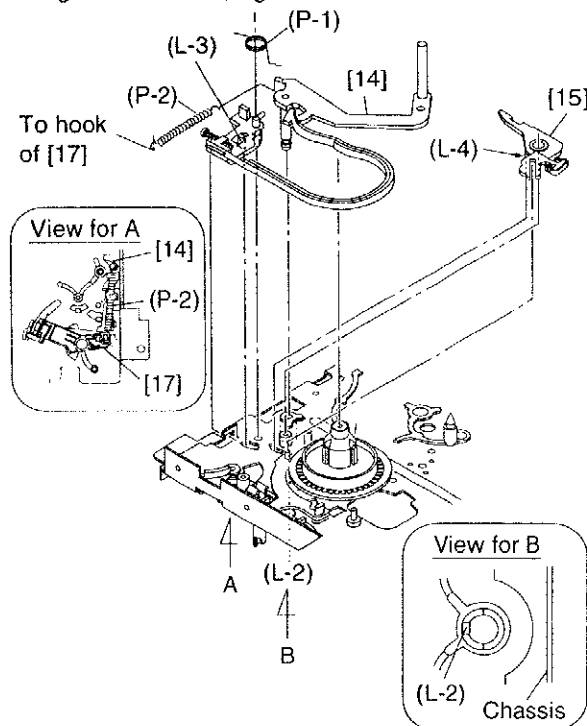


Fig. DM10

View for A

Reassembly [17], [18] and (P-3).

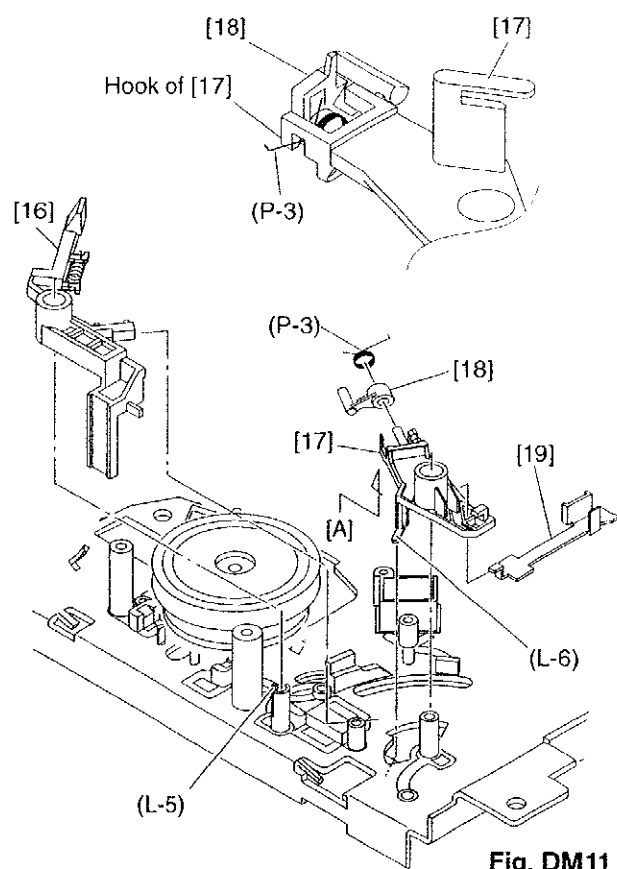


Fig. DM11

Turn [8] counterclockwise to move [20] to the right. Align the indent of [20] with Locking Tab.

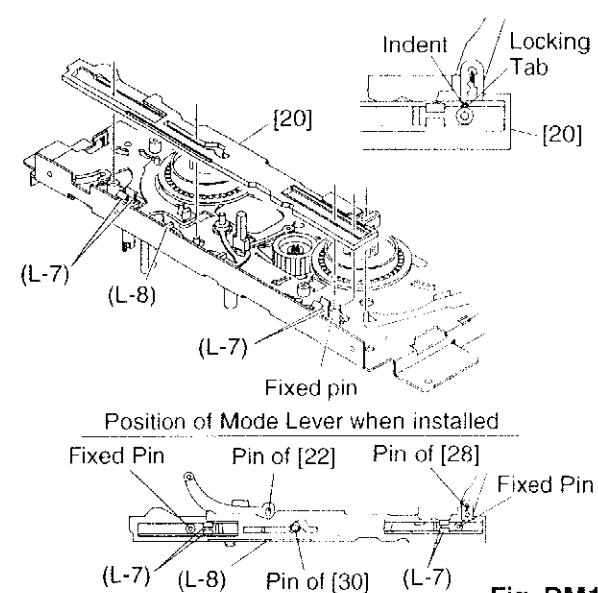


Fig. DM12

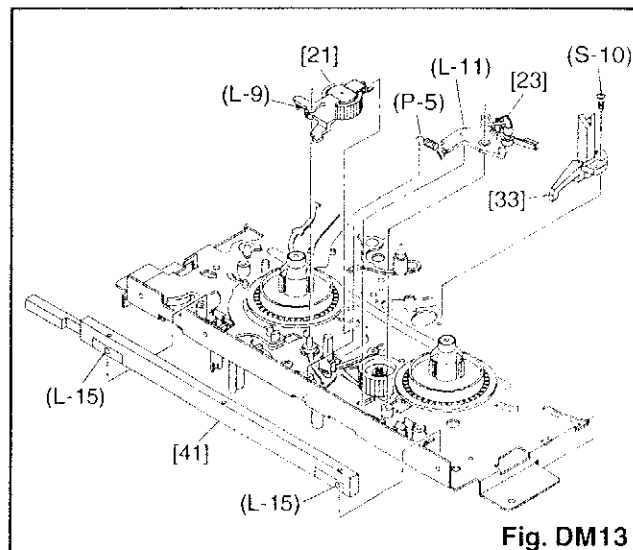


Fig. DM13

If the alignment height is not correct, it is acceptable to use one more Poly Slider Washer to raise the height. (Poly Slider Washer is 0.1 mm / 0.004 inch in thickness.)

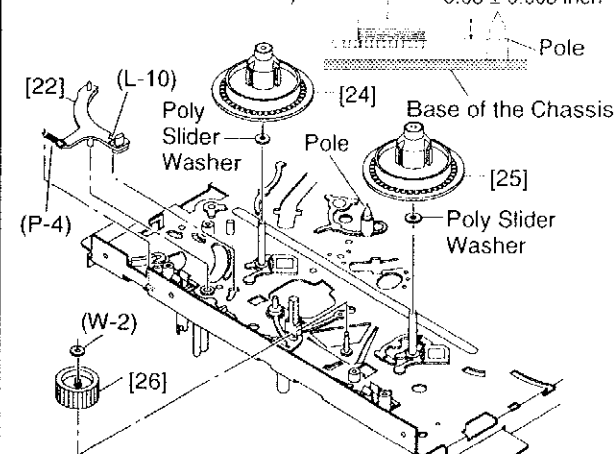


Fig. DM14

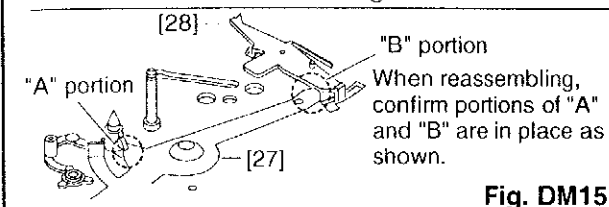
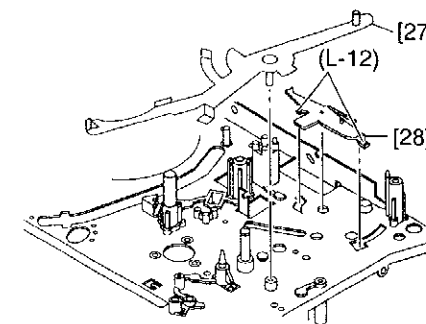


Fig. DM15

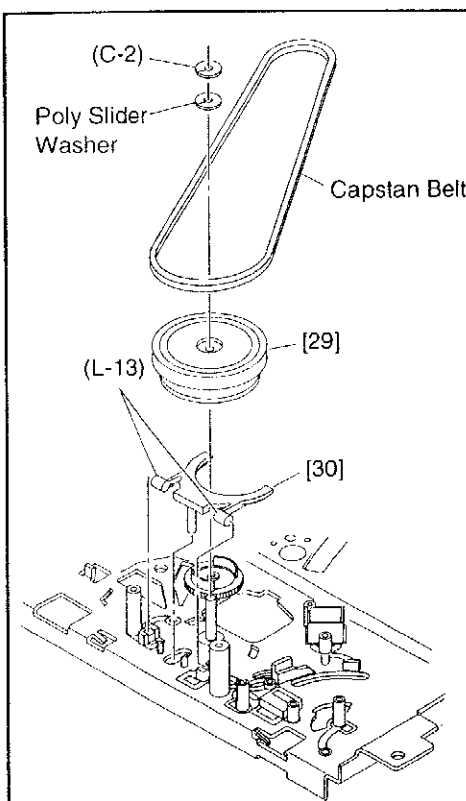


Fig. DM16

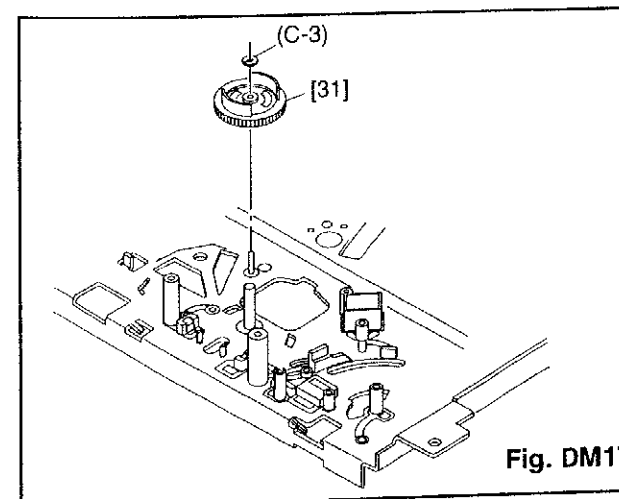


Fig. DM17

Refer to the Alignment Section, Page 2-4-10.

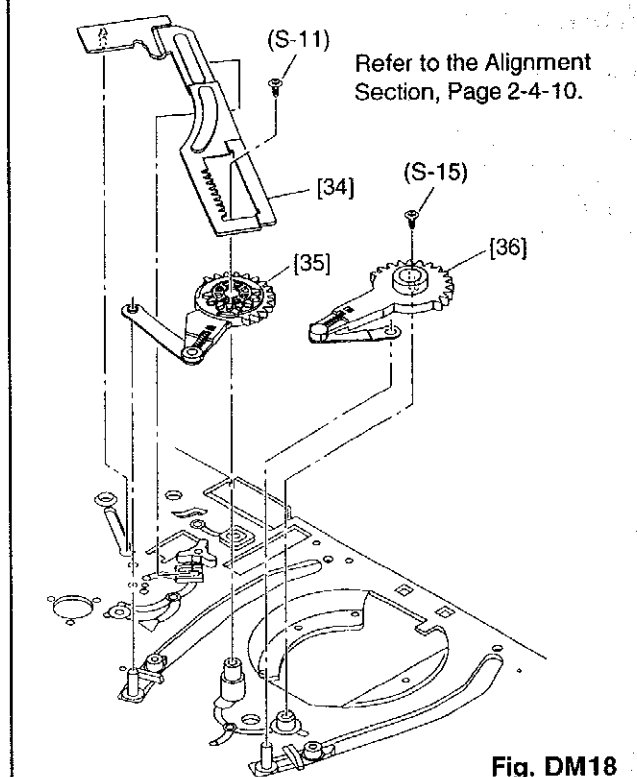


Fig. DM18

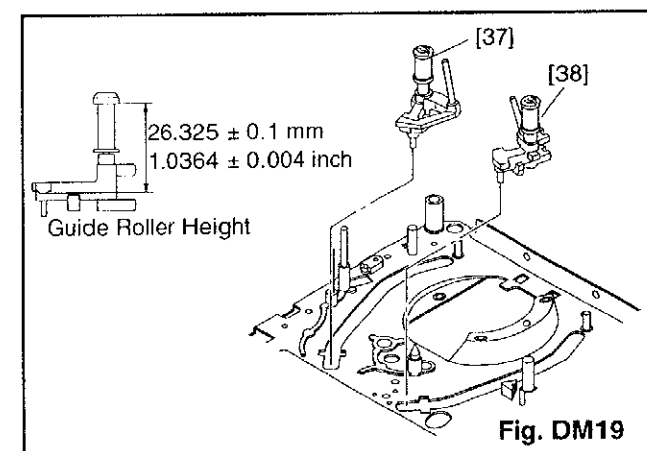


Fig. DM19

Front Loading Assembly

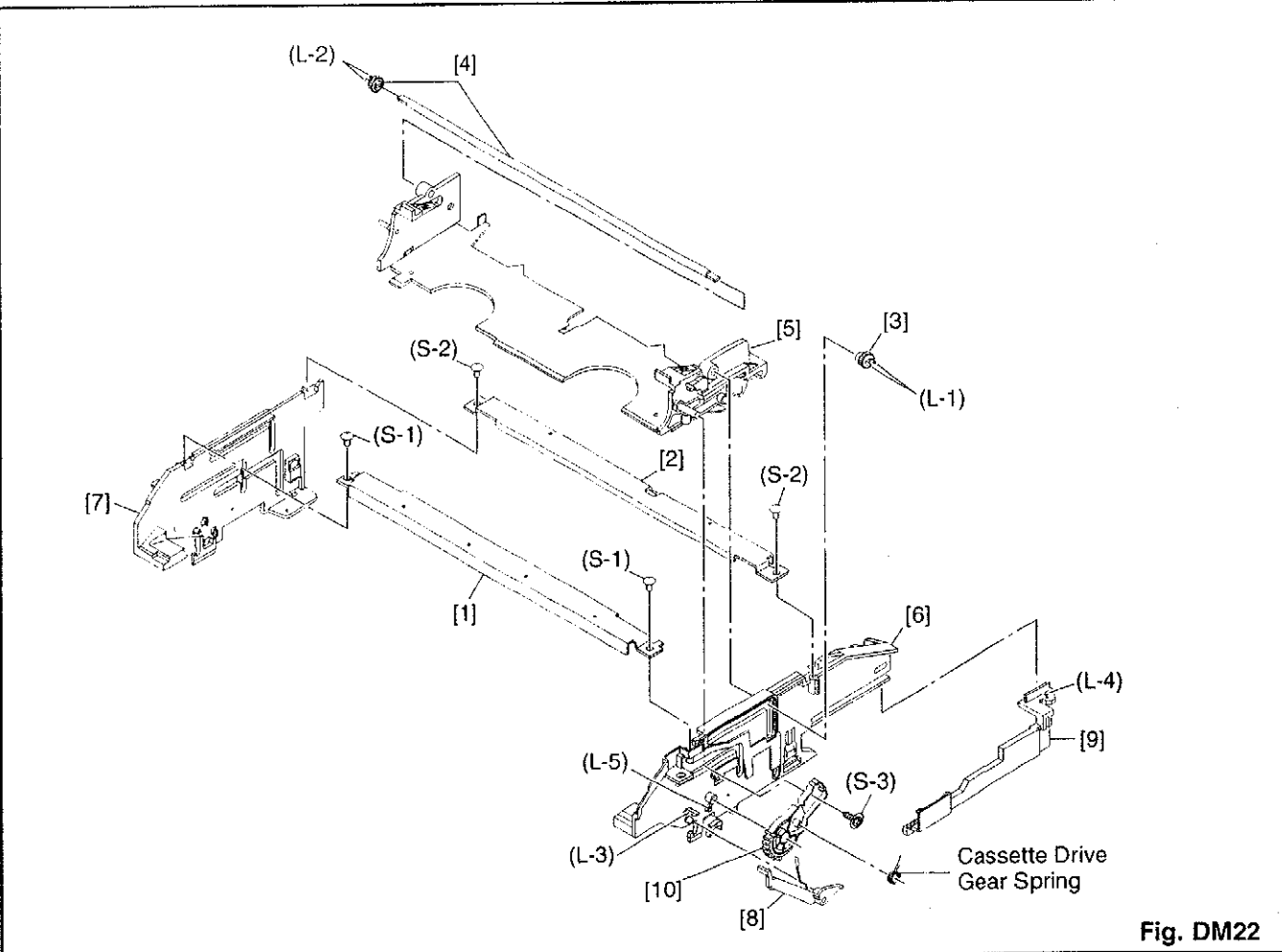
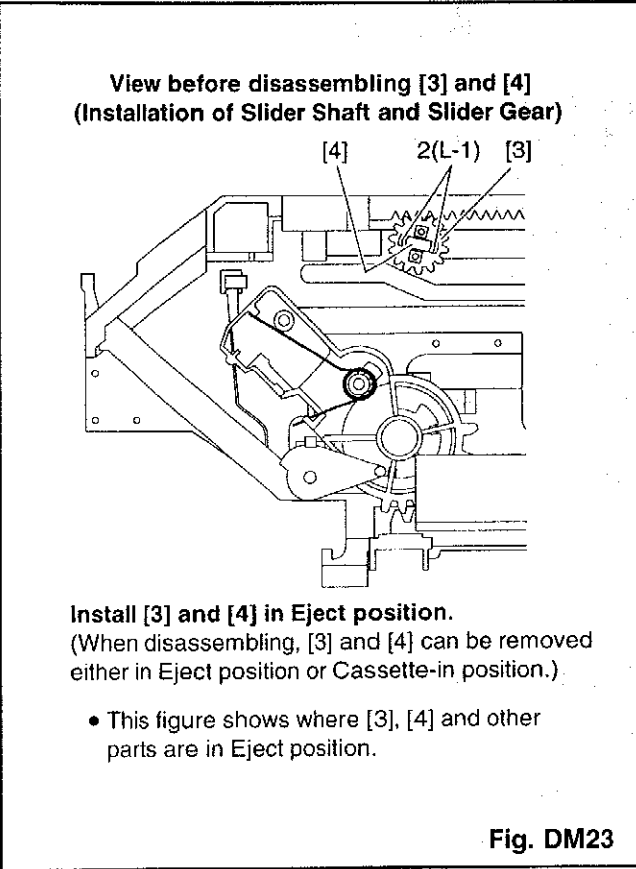
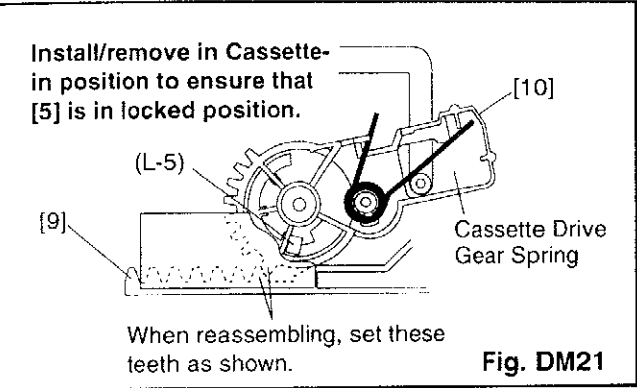
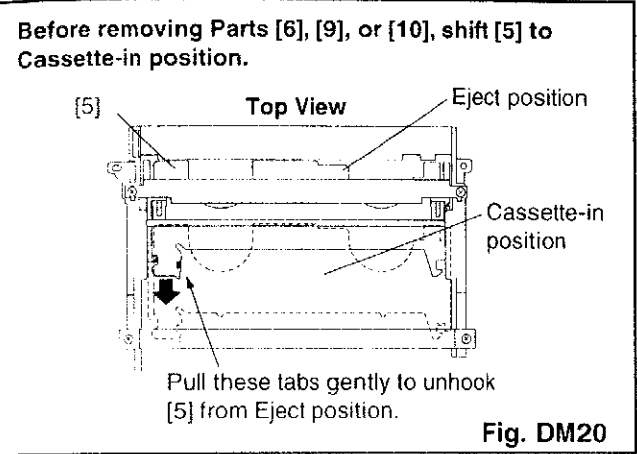
Before following the procedures described below, be sure to remove Front Loading Assembly from the main mechanism of the deck assembly. (See Fig. DM1.) When reassembling, start with the unit in Cassette-in mode and follow the steps in reverse order.

STEP /LOC. No.	START-ING No.	PART		REMOVAL		INSTALLATION
				Fig. No.	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	ADJUSTMENT CONDITION
[1]	[1]	Guide Holder B	T	DM22	2(S-1)	
[2]	[1]	Guide Holder F	T	DM22	2(S-2)	
*[3]	[3]	Slider Gear	R	DM22 DM23	2(L-1)	Eject Position
*[4]	[3]	Slider Gear	L	DM22 DM23	2(L-2)	Eject Position
		Slider Shaft	T	DM22 DM23		Eject Position
[5]	[1]	Cassette Holder Assembly	T	DM20 DM21 DM22	(S-3)	
[6]	[1]	Cassette Guide R	R	DM20 DM21 DM22		
[7]	[1]	Cassette Guide L	L	DM22		
[8]	[8]	Front Door Opener	R	DM22 DM23	(L-3)	Eject Position
[9]	[9]	Rack	R	DM20 DM21 DM22	(L-4)	Cassette in Position
[10]	[9]	Cassette Drive Gear	R	DM20 DM21 DM22	(L-5),Cassette Drive Gear Spring	Cassette in Position

① ② ③ ④ ⑤ ⑥ ⑦

- ①: Follow steps in sequence. When reassembling, follow the steps in reverse order. These numbers are also used as Identification (location) No. of parts in the figures.
- ②: Indicates the part to start disassembling with in order to disassemble the part in column (1).
- ③: Name of the part
- ④: Location of the part: T=Top B=Bottom R=Right L=Left
- ⑤: Figure Number
- ⑥: Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered. P=Spring, W=Washer, C=Cut Washer, S=Screw, *=Unhook, Unlock, Release, Unplug, or Desolder e.g., 2(L-2) = two Locking Tabs (L-2).
- ⑦: Adjustment Information for Installation
(+): Refer to Deck Exploded Views for lubrication.

*[3], *[4]: Slider Gear in Step [3] and that in Step [4] are identical. However, they are divided into two steps because, before reassembling Slider Shaft, one Slider Gear must be preinstalled at either end of Slider Shaft.



ALIGNMENT PROCEDURES OF MECHANISM

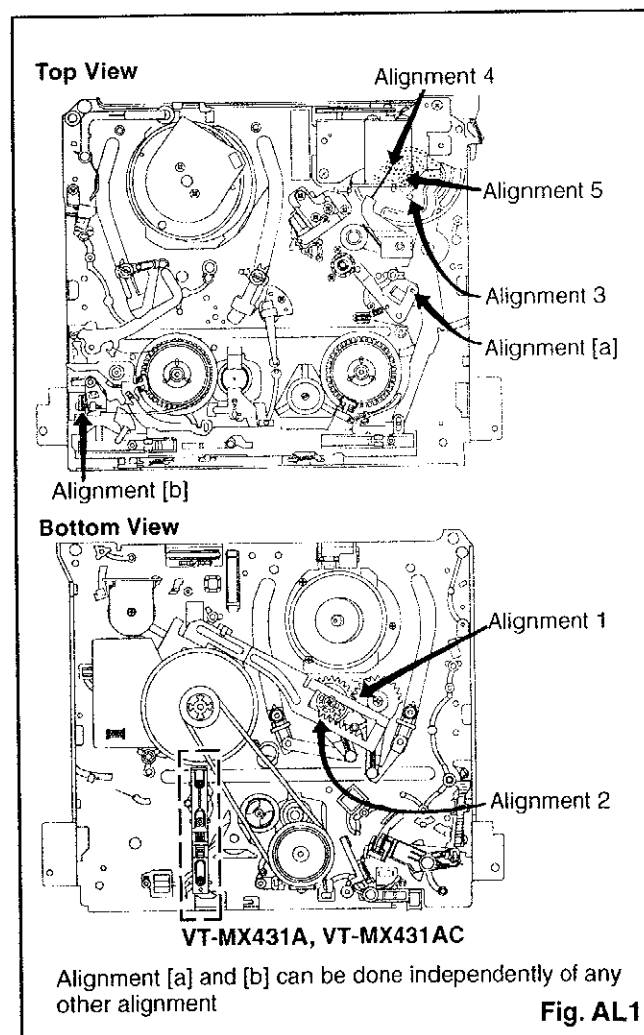
The following procedures describe how to align the individual gears and levers that make up the tape loading/unloading mechanism. Since information about the state of the mechanism is provided to the System Control Circuit only through the Mode Switch, it is essential that the correct relationship between individual gears and levers be maintained.

All alignments are to be performed with the mechanism in Eject mode, in the sequence given. Each procedure assumes that all previous procedures have been completed.

IMPORTANT:

If any one of these alignments is not performed properly, even if off by only one tooth, the unit will unload or stop and it may result in damage to the mechanical or electrical parts.

Alignment points in Eject Position



Alignment 1

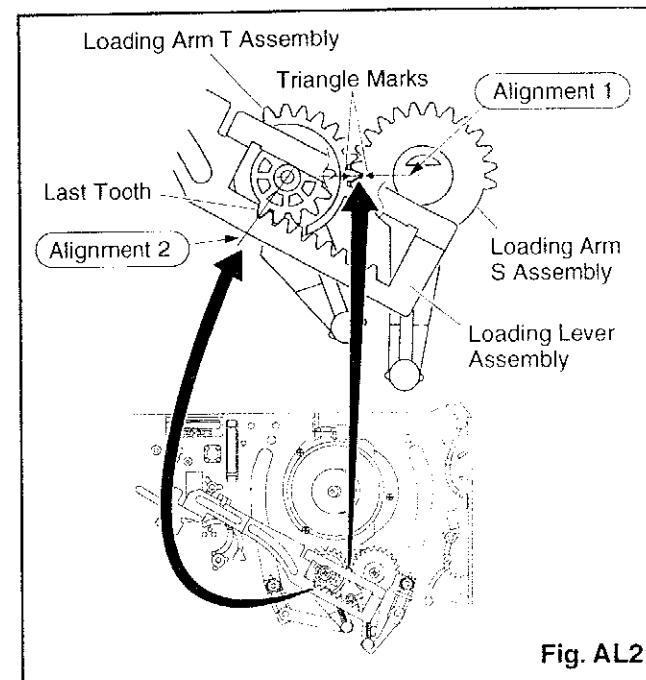
Loading Arm, S and T Assembly

1. Install Loading Arm S and T Assembly so that their triangle marks point to each other as shown in Fig. AL2.

Alignment 2

Loading Lever Assembly

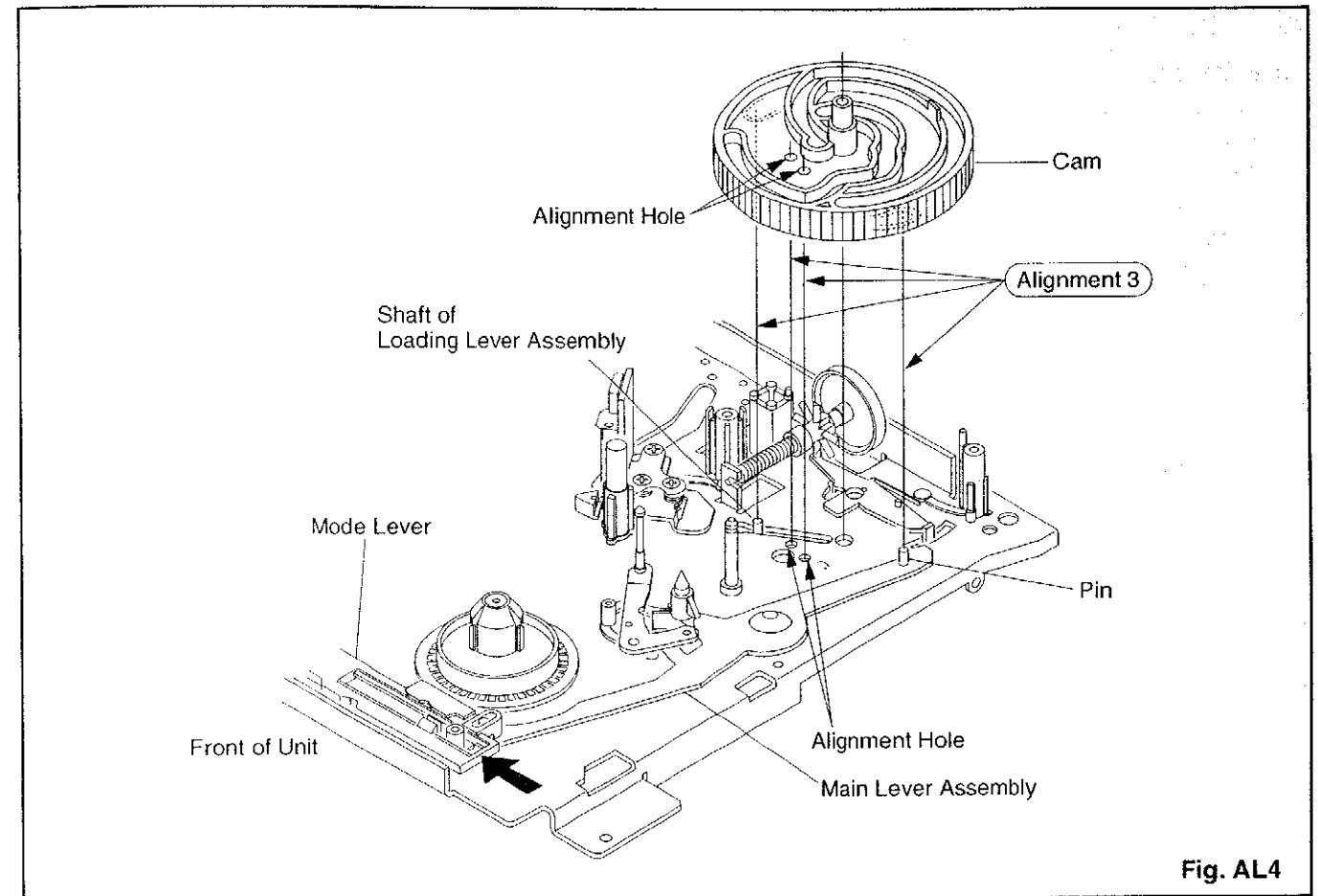
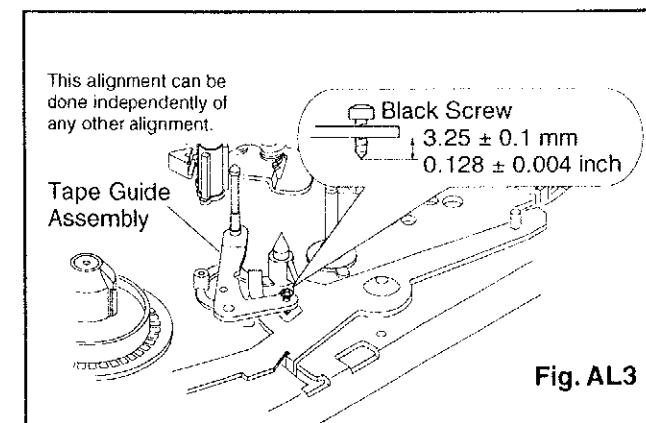
1. Keeping the two triangles pointing at each other, install the Loading Arm T Assembly so that the last tooth of the gear meets the most inside teeth of the Loading Lever Assembly. See Fig. AL2.



Alignment [a]

Tape Guide Assembly

1. Measurement of the black screw must be as specified in Fig. AL3.



Alignment 3

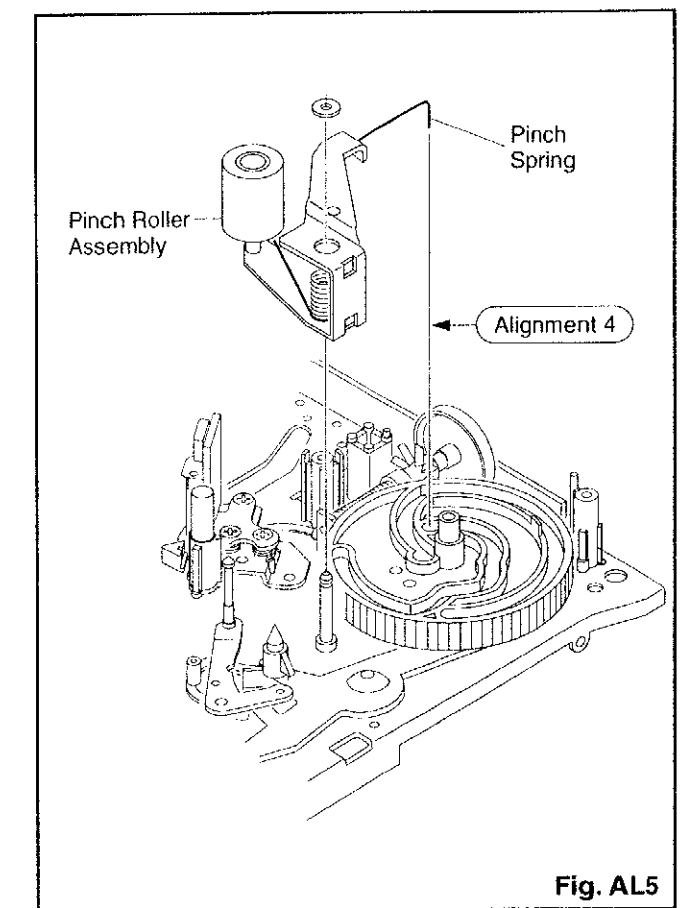
Cam

1. Make sure that the mechanism is in Eject mode so that the shaft of Loading Lever Assembly is in the position shown in Fig. AL4.
2. Align the alignment hole of the Cam with the alignment hole of the base, holding the Cam just above the base.
3. Carefully keeping these two holes aligned, push Mode Lever in the direction of the arrow to install the Cam. The Mode Lever must be pushed to make the pin on the Main Lever Assembly fit in the proper groove in the lower Cam.
4. After installing the Cam, make sure that the alignment hole of the Cam is still aligned with the base hole and that the pin on the Main Lever Assembly and the shaft of the Loading Lever Assembly are inserted into the proper grooves of the lower Cam as specified in Fig. AL4.

Alignment 4

Pinch Roller Assembly

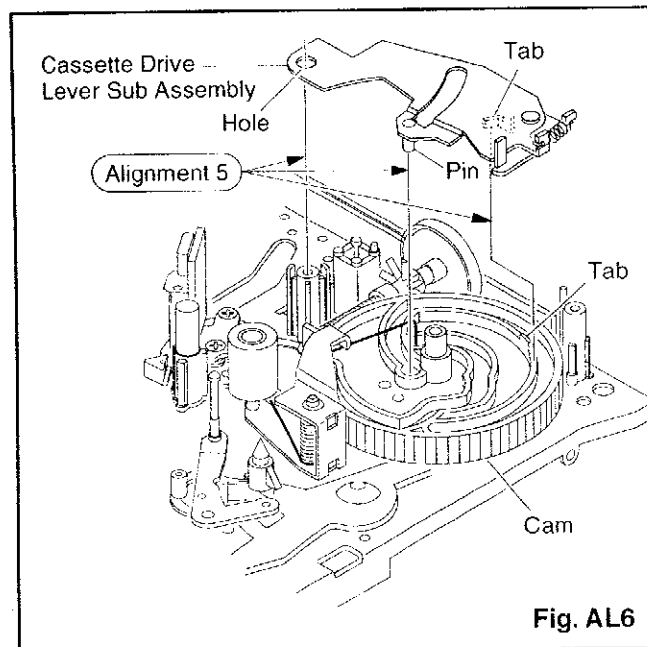
1. Ensure that the Spring of the Pinch Roller Arm Assembly is positioned in the end of the groove of the upper Cam as shown in Fig. AL5.



Alignment 5

Cassette Drive Lever Sub Assembly

1. Ensure that the pin of the Cassette Drive Lever Sub Assembly is positioned in the groove of the upper Cam and that the hole is positioned as shown in Fig. AL6. Then, make sure that the tab of the Cassette Drive Lever Sub Assembly is in front of the tab of the Cam.

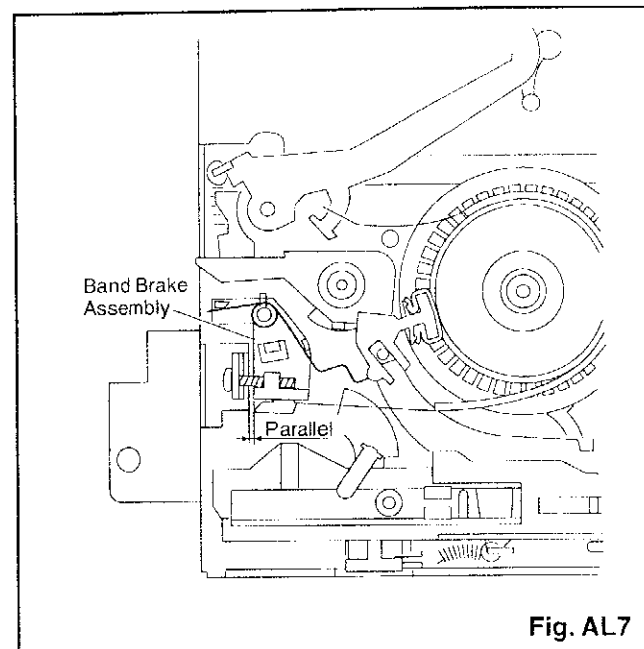


Alignment [b]

This alignment can be performed independently of any other alignment.

Band Brake Assembly

1. Ensure that Band Brake Assembly is positioned parallel to the chassis' notch as shown in Fig. AL7. This measurement can be made by eye.



EXPLODED VIEWS AND PARTS LIST SECTION

VIDEO CASSETTE RECORDER

VT-MX231A / VT-MX231AC / VT-MX231AW
VT-MX431A / VT-MX431AC

EXPLODED VIEWS AND PARTS LIST SECTION

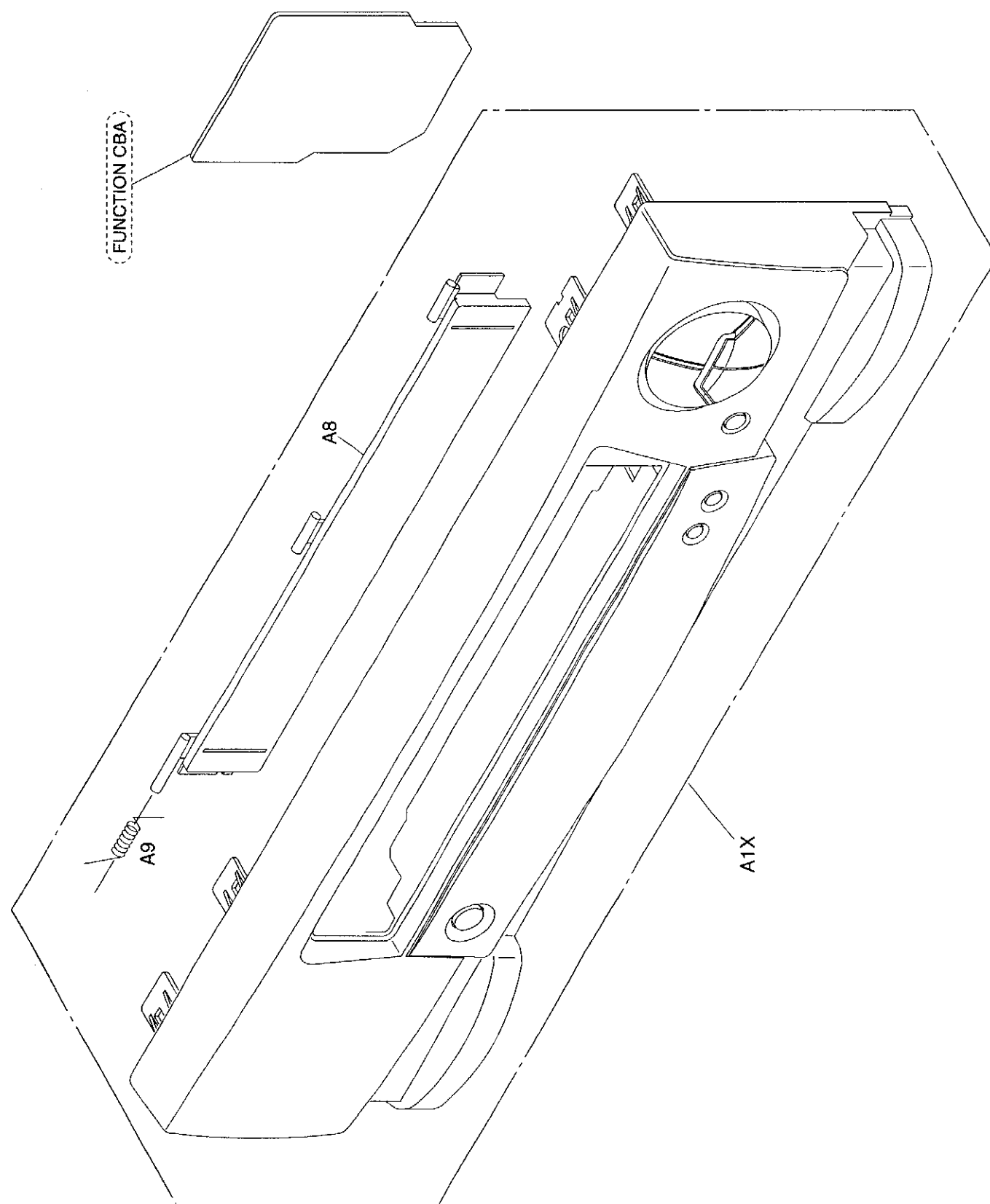
- Exploded views
- Parts List

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Mechanical Parts List.....	3-2-1
Electrical Parts List	3-3-1

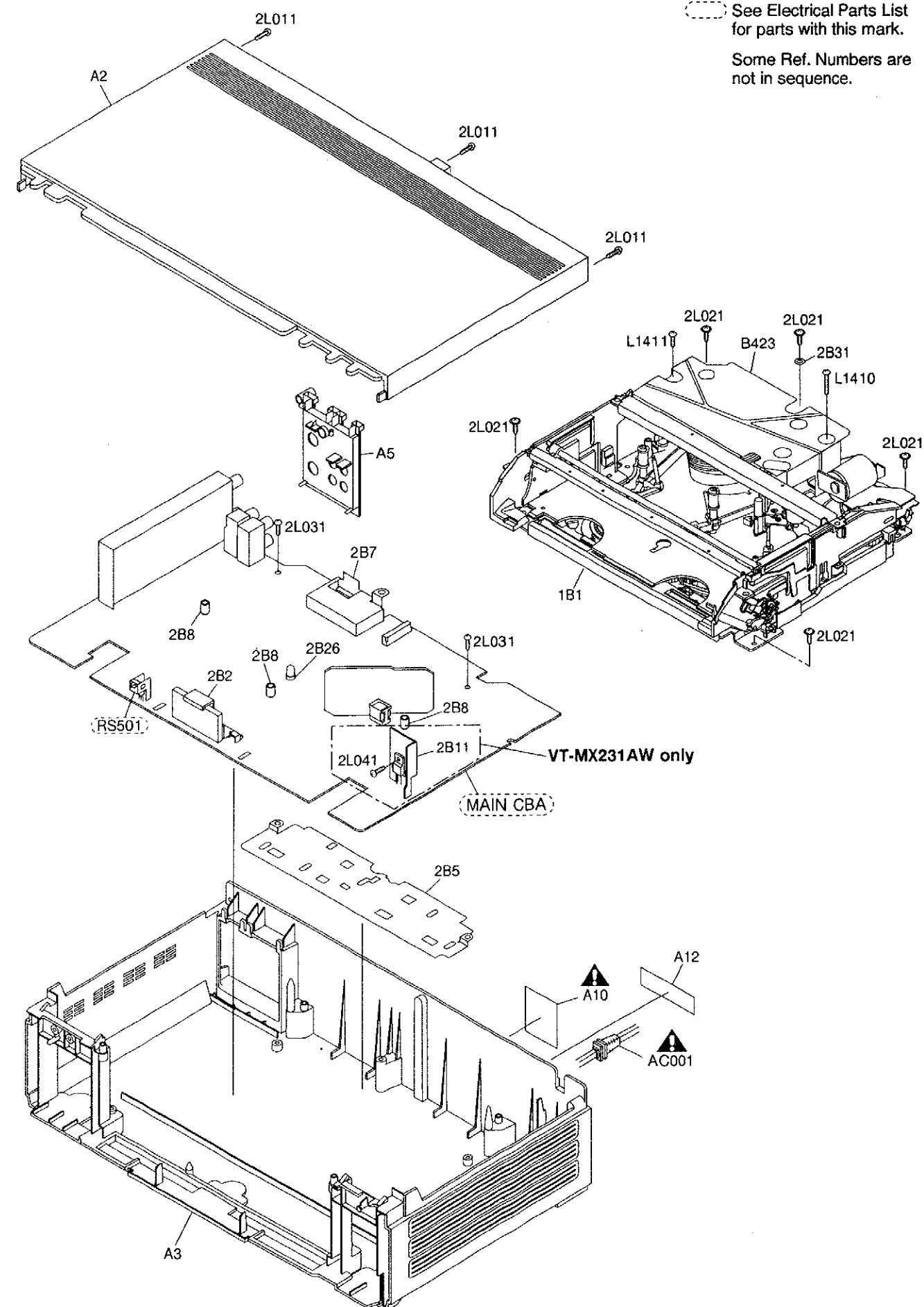
EXPLODED VIEWS

Front Panel



3-1-1

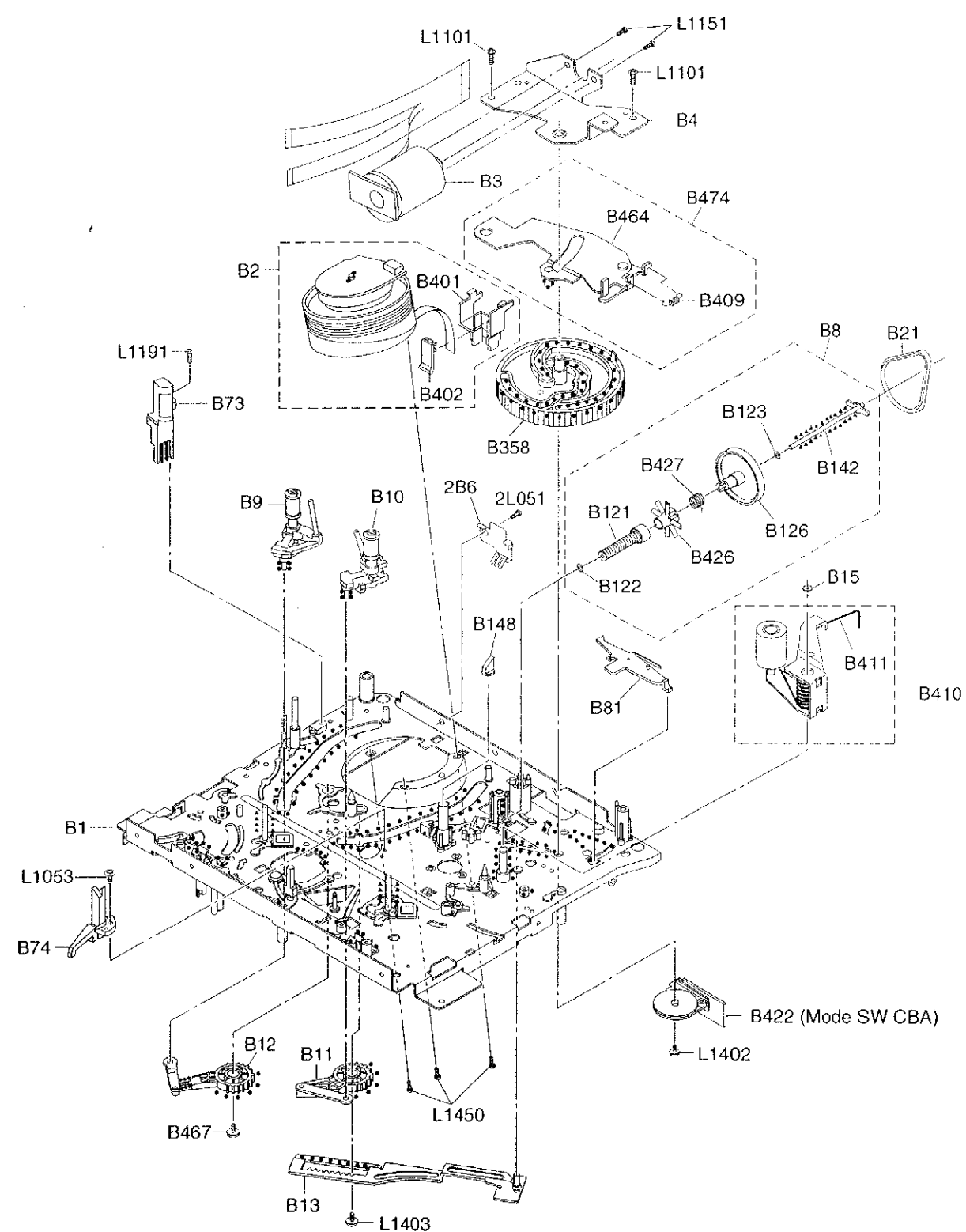
Cabinet



3-1-2

Deck Mechanism View 1

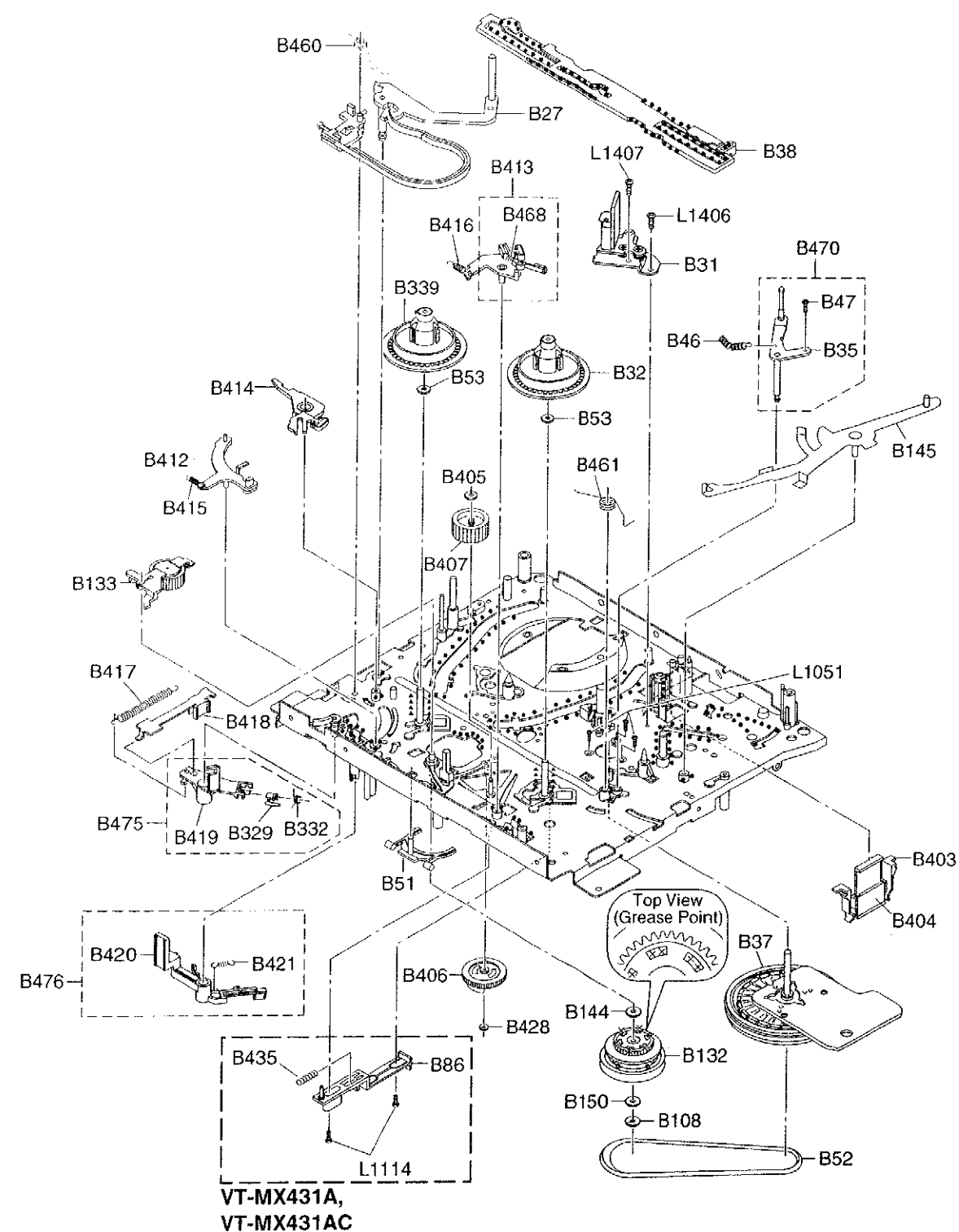
Mark	Description
•••••	Floil G-374G (Blue grease)
▲▲▲▲▲	Haidoro Frudo EP56 (Spindle oil)



Some Ref. Numbers are not in sequence.

Deck Mechanism View 2

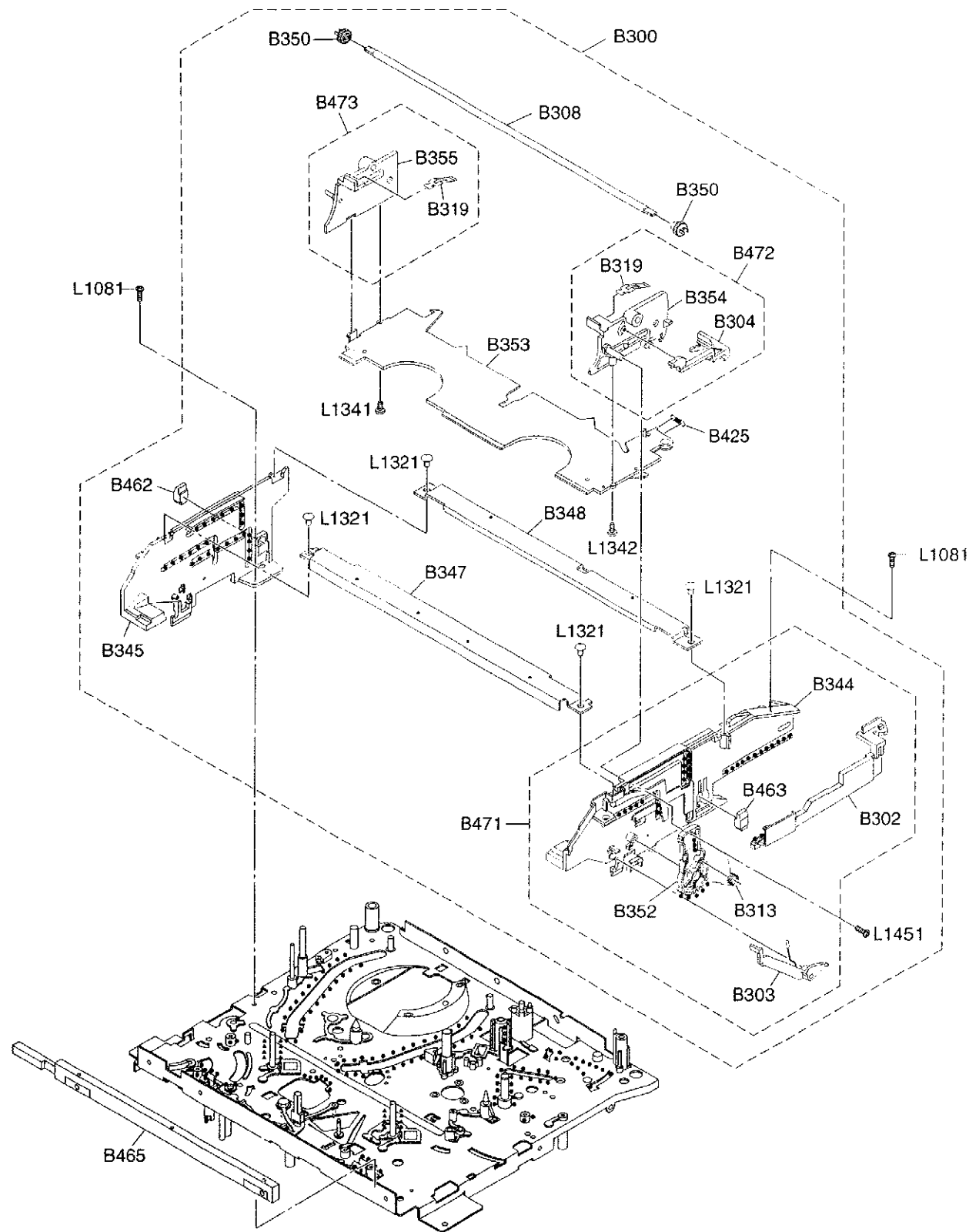
Mark	Description
× × × × ×	Sankohl FG-84M (White grease)
• • • • •	Floil G-374G (Blue grease)
▲ ▲ ▲ ▲ ▲	Haidoro Frudo EP56 (Spindle oil)



Some Ref. Numbers are not in sequence.

Deck Mechanism View 3

Mark	Description
*****	Floil G-374G (Blue grease)
▲▲▲▲	Haidoro Frudo EP56 (Spindle oil)



Some Ref. Numbers are not in sequence.

MECHANICAL PARTS LIST

SYMBOL NO	P-NO	DESCRIPTION	SYMBOL NO	P-NO	DESCRIPTION
MECHANISM SECTION					
2B 2	TE12383	HOLDER	B 304	TE12922	OPENER, DOOR
2B 5	TE13018	SHIELD, BOTTOM	B 308	TE12923	SHAFT, SLIDER
2B 6	TE12967	PLATE, EARTH DECK	B 313	TE13077	SPRING, GEAR DRIVE
2B 7	TE13037	SHIELD, HEAD	B 319	TJ13446	SPRING
2B 8	TE13038	BUSH, LED (D)	B 329	TJ12627	ARM, HOLDER KICK
2B 11	TE13011	HEATSINK [MX231AW]	B 332	TJ13447	SPRING
2B 26	TE13039	BUSH, LED (E)	B 339	TE12926	REEL S
2B 31	TE13019	WASHER	B 344	TE12928	GUIDE, CASSETTE R
2L 011	TJ12534	SCREW (3X12)	B 345	TE12929	GUIDE, CASSETTE L
2L 021	TJ10119	SCREW (3X10)	B 347	TE12931	HOLDER, GUIDE F
2L 031	TJ10177	SCREW (3X8)	B 348	TE12377	GUIDE HOLDER (R)
2L 041	TE11189	SCREW (M3X10) [MX231AW]	B 350	TE12395	SLIDER GEAR
2L 051	TJ10149	ROLLER, GUIDE (T)	B 352	TE12933	GEAR, CASSETTE DRIVE
▲AC 001	TE11946	AC CORD	B 353	TE12934	PLATE, CASSETTE
A 2	TE12992	COVER, TOP	B 354	TE12935	SLIDER S
A 5	TE12357	JACK BOARD	B 355	TE12936	SLIDER R
A 8	TE13015	DOOR, CASSETTE	B 358	TE12937	CAM
A 9	TE13016	SPRING, DOOR	B 401	TE13013	CONNECTOR [MX231A/AC/AW]
A1X	TE12991	PANEL, FRONT [MX231A/AC/AW]	B 401	TE13056	CONNECTOR [MX231A/AC]
A1X	TE13058	PANEL, FRONT [MX431A/AC]	B 402	TE13014	CONNECTOR [MX231A/AC/AW]
B 2	TE12893	CYLINDER ASSY [MX231A/AC/AW]	B 402	TE13057	CONNECTOR [MX431A/AC]
B 2	TE12894	CYLINDER ASSY [MX431A/AC]	B 403	TE12939	CONNECTOR
B 3	TE12896	MOTOR, LOADING	B 404	TE12941	CONNECTOR
B 4	TE12396	MOTOR HOLDER	B 405	TE12942	WASHER
B 8	TJ13443	PULLEY	B 406	TE12943	GEAR, SENSOR
B 9	TE12897	GUIDE, MOVING S	B 407	TE12388	M GEAR
B 10	TE12898	GUIDE, MOVING T	B 409	TE12944	SPRING, EJECT
B 11	TE12899	ARM, LOADING T	B 410	TE12945	ROLLER, PINCH
B 12	TE12901	ARM, LOADING S	B 411	TE12946	SPRING, PINCH
B 13	TE12902	LEVER, LOADING	B 412	TE12947	LEVER, BRAKE S
B 15	TJ10155	WASHER	B 413	TE13078	BRAKE, T
B 21	TE12409	LOADING BELT	B 414	TE12949	BRAKE, S
B 27	TE12903	LEVER, TENSION	B 415	TE12951	BRAKE, L
B 31	TE12904	HEAD, AC	B 416	TE12952	BRAKE, T
B 32	TE12449	REEL BASE	B 417	TE12406	SPRING [MX231A/AC/AW]
B 35	TE12435	TAPE GUIDE	B 417	TE13045	SPRING [MX431A/AC]
B 37	TE12907	MOTOR, CAPSTAN	B 418	TE12416	TENSION PLATE
B 38	TE12908	LEVER, MODE	B 419	TE12953	ARM, BT
B 46	TE12404	SPRING	B 420	TE12954	ARM, REC
B 47	TJ10222	SCREW	B 421	TE12407	SPRING
B 51	TE12909	ARM, FF	B 422	TE12972	MODE SW CBA
B 52	TE12611	CAPSTAN BELT	B 423	TE13017	SHIELD, CYLINDER
B 53	TJ10228	WASHER	B 425	TE12955	SPRING, LOCK LEVER
B 73	TE12911	HEAD, FE	B 426	TE12386	KICK PULLEY
B 74	TE12912	PRISM	B 427	TE12401	KICK SPRING
B 81	TE12913	LEVER, HOLDER M	B 428	TE12942	WASHER
B 86	TE12914	BRAKE [MX431A/AC]	B 435	TE12957	SPRING [MX431A/AC]
B 108	TJ10229	WASHER	B 460	TE12958	SPRING, BT
B 121	TE12385	WORM	B 461	TE12959	SPRING, MAIN LEVER
B 122	TJ10165	WASHER	B 462	TE12961	PRISM, L
B 123	TJ10166	WASHER	B 463	TE12962	PRISM, R
B 126	TE12384	PULLEY	B 464	TE12963	LEVER, CASSETTE DRIVE
B 132	TE12915	CLUTCH ASSY	B 465	TE12964	COVER, INSULATION
B 133	TE12916	IDLER ASSY	B 467	TE12965	ARM, SCREW
B 142	TJ10173	SHAFT LOCK	B 468	TE12966	SPRING, SOFT BRAKE
B 144	TJ10234	WASHER	B 470	TE13046	ARM, TAPE GUIDE
B 145	TE12917	LEVER, MAIN	B 471	TE13047	CASSETTE GUIDE R
B 148	TE12612	TG CAP	B 472	TE13048	SLIDER R
B 150	TJ10228	WASHER	B 473	TE13049	SLIDER L
B 300	TE12918	FL ASSY	B 474	TE13051	LEVER, CASSETTE DRIVE
B 302	TE12919	RACK	B 475	TE13052	ARM, BT
B 303	TE12921	DOOR OPENER, FRONT	B 476	TE13053	LEVER, BRAKE (S)
			L 1051	TJ12636	SCREW (M2.6X6)
			L 1053	TE13054	SCREW PRISM
			L 1081	TJ10176	SCREW (3X6)
			L 1101	TJ10115	SCREW (3X10)

SYMBOL NO	P-NO	DESCRIPTION	SYMBOL NO	P-NO	DESCRIPTION
L 1114	TJ13454	SCREW (M2X6) [MX431A/AC]			
L 1151	TJ10178	SCREW (M3X4)			
L 1191	TJ13016	SCREW (M2.6X12)			
L 1321	TJ10177	SCREW (3X8)			
L 1341	TJ12687	SCREW (M2.6X8)			
L 1342	TE13079	SCREW (M2.6X6)			
L 1402	TJ13454	SCREW (M2X6)			
L 1403	TJ10119	SCREW (3X10)			
L 1406	TJ13455	SCREW (M2.6X4)			
L 1407	TJ13014	SCREW (M2.6X8)			
L 1410	TJ13441	SCREW (M3X25)			
L 1411	TJ10176	SCREW (3X6)			
L 1450	TE12971	SCREW M2.6X5			
L 1451	TE13055	SCREW, SLIDER R			
FOR ACCESSORIES					
X 1	TE12996	REMOTE HAND SET [MX231A/AC/AW]			
X 1	TE13024	REMOTE HAND SET [MX431A/AC]			
X 3	5857952	RF CABLE			
X 6	TE12997	PLUG [MX231AW]			

ELECTRICAL PARTS LIST

SYMBOL NO	P-NO	DESCRIPTION	SYMBOL NO	P-NO	DESCRIPTION
RESISTOR			Q 311	TC10623	TRANSISTOR KTA1267
VR 501 TC10898 CARBON 100KOHM			Q 401	TC10138	TRANSISTOR 2SC3331
SEMI-CONDUCTORS			Q 402	TC10138	TRANSISTOR 2SC3331
D 001	TC10752	DIODE 1A5	Q 403	TC10777	TRANSISTOR 2SD734F-NP-AQ
D 002	TC10752	DIODE 1A5	Q 404	TC10628	TRANSISTOR 2SA608SP
D 003	TC10752	DIODE 1A5	Q 408	TC10784	TRANSISTOR KTA1266
D 004	TC10752	DIODE 1A5	Q 501	TC10562	TRANSISTOR 2SC3400 [MX431A/AC]
D 005	TC10791	RECTIFIER DIODE BA157 [EXCEPT FOR MX231AW]	Q 503	TC10145	PHOTO TRANSISTOR PT380F
D 006	TC10112	DIODE 1N4148M	Q 504	TC10145	PHOTO TRANSISTOR PT380F
D 007	TC10112	DIODE 1N4148M	Q 511	TC10624	TRANSISTOR KTC3199
D 008	TC10112	DIODE 1N4148M [EXCEPT FOR MX231AW]	Q 514	TC10145	PHOTO TRANSISTOR PT380F
D 012	TC10791	RECTIFIER DIODE BA157	Q 851	TC10623	TRANSISTOR KTA1267
D 013	TC10791	RECTIFIER DIODE BA157	TRANSFORMERS		
D 015	TC10757	DIODE RU2YX	▲ T 001	TC10872	PULSE TRANS [EXCEPT FOR MX231AW]
D 016	TC10877	DIODE SB140	▲ T 001	TC11058	PULSE TRANS [MX231AW]
D 017	TC10791	RECTIFIER DIODE BA157	COILS		
D 018	TC10604	ZENER DIODE UZ-9.1BSC	▲ L 001	TA12553	COIL 33MH
D 052	TC10112	DIODE 1N4148M	L 002	TA12575	CORE
D 053	TE13008	ZENER DIODE MTZJT-775.6C	L 003	TA12554	CORE
D 055	TC10752	DIODE 1A5	L 004	TA12554	CORE
D 057	TC10112	DIODE 1N4148M	L 007	TA12554	CORE
D 058	TC10787	ZENER DIODE UZ-30BSB	L 008	TA12555	COIL 22UH
D 059	TC10603	ZENER DIODE UZ-6.8BSA	L 009	TA12555	COIL 22UH
D 301	TC10112	DIODE 1N4148M	L 252	TA12555	COIL 22UH
D 302	TC10112	DIODE 1N4148M	L 307	TE13035	CHOKE COIL 47UH-K
D 303	TC10112	DIODE 1N4148M	L 312	TE12676	COIL 82UH
D 305	TC10112	DIODE 1N4148M	L 401	TE13036	CHOKE COIL 47UH-K
D 501	TC10112	DIODE 1N4148M	L 501	5121292	COIL 47UH
D 502	TC10112	DIODE 1N4148M	L 502	TA12555	COIL 22UH
D 503	TC10112	DIODE 1N4148M	L 504	TA12562	COIL 12UH
D 504	TC10112	DIODE 1N4148M	L 702	TA10165	COIL 18UH
D 505	TC10112	DIODE 1N4148M	L 851	TA13032	COIL 18UH
D 511	TA13035	LED L-1543F3C	CRYSTALS		
D 531	TC10112	DIODE 1N4148M	X 301	TA12551	CRYSTAL
D 701	TC10607	ZENER DIODE UZ-33BSD	X 502	TA12551	CRYSTAL
D 851	TC10112	DIODE 1N4148M	MISCELLANEOUS		
▲ IC 001	TC10763	PHOTOCOUPLER PS2501-1D	CN 501	TJ13456	CONNECTOR
IC 002	TC10764	IC KIA431	CN 502	TE13005	CONNECTOR
IC 251	TC10889	IC LA70001 [MX231A/AC/AW]	CN 503	TE13006	CONNECTOR
IC 251	TC10901	IC LA70011 [MX431A/AC]	CN 505	TE12666	CONNECTOR [MX231A/AC/AW]
IC 301	TE13032	IC LA71021M	CN 505	TE12456	CONNECTOR [MX431A/AC]
IC 501	TE13009	IC M37779M5A136GP [MX231A/AC/AW]	CN 507	TE11939	CONNECTOR
IC 501	TE13033	IC M37779M5A137GP [MX431A]	CN 651	TE11958	CONNECTOR
IC 501	TE13004	IC M37779M5A138GP [MX431AC]	▲ F 001	TE11947	FUSE 1A 250V
IC 503	TC10769	IC KIA324P	FH 001	TE11084	HOLDER
IC 751	TC10773	IC HCF4052BEY	FH 002	TE11084	HOLDER
IC 851	TC10774	IC LC74723-9068	FIP502	TE13041	LCD
IC507A	5300811	IC TA7291S	JK 751	TE11172	JACK
IC507B	TC10772	IC LB1641	JK 752	TE11172	JACK
▲ Q 001	TC10776	TRANSISTOR 2SC4418 [EXCEPT FOR MX231AW]	RS 501	TE13043	REMOTE RECEIVER
▲ Q 001	TC10136	TRANSISTOR 2SC4517 [MX231AW]	▲ SA 001	TC10891	SURGE ABSORBER ENC471D-10AC
▲ Q 002	TC10777	TRANSISTOR 2SD734F-NP-AQ [EXCEPT MX231AW]	SW 281	TC10894	MODE SWITCH
▲ Q 002	TC10775	TRANSISTOR 2SC4204 [MX231AW]	SW 501	TE11957	SWITCH
Q 053	TC11057	TRANSISTOR KTA1271Y	SW 502	TE11957	SWITCH
Q 054	TC10622	TRANSISTOR KTC3199	SW 505	TE11957	SWITCH
Q 055	TC10628	TRANSISTOR 2SA608SP	SW 506	TE11161	SWITCH
Q 303	TC10562	TRANSISTOR 2SC3400	SW 654	TE11957	SWITCH
Q 304	TC10622	TRANSISTOR KTC3199			
Q 305	TC10563	TRANSISTOR 2SA608SP			
Q 307	TC10563	TRANSISTOR 2SA608SP			
Q 308	TC10784	TRANSISTOR KTA1266			

SYMBOL NO	P-NO	DESCRIPTION	SYMBOL NO	P-NO	DESCRIPTION
SW 661	TE11957	SWITCH			
SW 662	TE11957	SWITCH			
SW 663	TE11957	SWITCH			
SW 676	TE11957	SWITCH			
SW 701	TE11942	SWITCH			
TU 701	TE13059	TUNER UNIT			

HITACHI

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